THE ENGINEERING AND MINING JOURNAL.

RICHARD P. ROTHWELL, C. E., M. E.
ROSSITER W. RAYMOND, Ph. D. } Editors.

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

MEMBERS and Associates elected at the Washington meeting are hereby notified that the ENGINEERING AND MINING JOURNAL will not be sent to them after this issue, if the election is not promptly accepted and dues paid for the current year.

THOMAS M. DROWN,
Lafayette College, Easton, Pa. Secretary.

ERRATUM.

IN our article on "The Decline in the Value of Consolidation Coal Company's Stock," page 246, of last week's issue, we made an error in stating that the "par" of the stock is $50; it should have been $100=par, and, consequently, the decline from $50 to $41 per share, though representing 18 per cent. of the market value, is but 9 per cent. of the par value of the stock. The total shrinkage would, therefore, be $922,500, not $1,845,000 as stated. We regret the error, and beg our readers will make the correction. We would not, wittingly, have overstated the injurious effect of the company's management on its stock, and we, therefore, hasten to say that, within a month, the decline has been 18 per cent. only on the market, not the par value of the stock.

THE HUNT AND DOUGLAS PROCESS.

IN his interesting letter, in another column, Prof. T. STERRY HUNT explains in his usual lucid and satisfactory manner some points in the chemistry of the HUNT & DOUGLAS process, which were left somewhat obscure by Mr. BRUNTON in his description of that process, (as carried out at the Stewart Reduction Works,) recently published in this Journal.

This method of treatment would, in our opinion, be well adapted to many of the Comstock ores also, and its adoption would, doubtless, effect an immense saving in their treatment. We have no doubt, the publication of what is being done will induce those in charge of the Comstock mines to investigate the claims of a process that has attained such satisfactory results in other fields.

PROF. SILLIMAN'S FEES AND THE EMMA MINE.

A PRESS despatch, dated Washington, March 9, stated that "Professor SILLIMAN appeared before the Committee on Foreign Affairs to-day and testified concerning his report on the Emma Mine.

"He said that he was employed by General HENRY H. BAXTER to make the examination. The statement that he was induced by a bribe to render a base and dishonest report was false. His compensation was not contingent, but he was left to fix his own compensation according to the value of the service to be rendered and the risks encountered. His terms were accepted without qualification, namely, the payment of $5,000 in advance; after the completion of the work he was to be paid in addition not less than $10,000, nor more than $20,000. He received $10,000, and for the performance of other scientific services was compensated, his entire receipts amounting to $25,000. The additional services consisted in examining mines in Utah and California, beside the Emma Mine, occupying six or eight months.

"He had not named any sum as an equivalent value of the Emma Mine, and he had seen no reason to depart from the opinion formed on his first and second visits to the mine.

"The witness said that profits to the extent of one million and a third dollars had resulted from the Emma Mine. Neglect of the work of exploration had rendered it impossible to obtain further treasure from the mine without expenditure of money. From the beginning of the enterprise he had no interest whatever in the stock, his connection with the mine being merely professional."

It certainly is not our intention to object to the liberal remuneration of professional experts and especially of mining experts. There is, probably, no other class of investments where capitalists are so entirely dependent on the reports of others, where, in fact, so much money is invested *on faith* in the honesty and ability of one or at most a small number of men, as in mining, and the remuneration should, unquestionably, be in proportion to the responsibility involved and the value of the property examined. Unfortunately this rule is, commonly, only partially observed. The responsibility remains, but, judging from a number of familiar cases, the remuneration for professional reports would almost appear to be *inversely* as the value of the mine.

Professor SILLIMAN says "he did not name any sum as an equivalent value for the Emma Mine, and has seen no reason to depart from the opinion formed on his first and second visits to the mine."

This raises a somewhat difficult question, as to the duty of an engineer whose favorable report upon a mine has been used to promote its sale at a price higher than what he regards to be its real value.

It must have been known to Prof. SILLIMAN, as to all the world, that his report was used publicly as an endorsement of the claim, made in the prospectus, that the mine was worth even more than $5,000,000. If Professor SILLIMAN did not concur in that opinion, was it his duty to protest against his name being used to mislead those who were investing upon the natural supposition that he endorsed the statements which his report was openly cited to sustain? He did not so protest; neither did Professor BLAKE, whose report was actually garbled and partly suppressed, to support the claim of the great value of the mine. It is not an altogether simple matter to decide the question of duty in such a case. True, an expert's report *should* express an opinion of the value of the property, and not merely form a basis for estimates by stock jobbers, and be cited in support of any wild figures which "promoters" may choose to put upon property of which they are admittedly ignorant.

But if an expert has been employed to advise intending purchasers, and they have decided, either in accordance with his advice, or in opposition to it, to consummate the purchase, may he or may he not interfere with the price they subsequently put on the property? If he thinks he is made an auxiliary to a swindle, he ought to denounce the scheme. If his report has been mutilated or garbled, so as to falsify his opinion, he certainly ought to express his indignation. But we do not suppose that Professor SILLIMAN considered the Emma scheme at any stage as a swindle. Apparently he still has faith in the mine itself, and holds himself in no way responsible for the watering, stock-jobbing, recrimination, extravagance, carlessness and panic which have characterized its management in English hands. We shall discuss hereafter, without reference to individuals, the question of duty above stated.

That this company has been very badly managed from the commencement is quite certain, else the worthlessness of the property would, long ago, have been demonstrated by proper exploration works, or possibly other ore bodies would have been found, and a mine worth $5,000,000 would have been made. As it is, but little is known beyond the fact that the ore body in which work was commenced is exhausted. Had the owners of the Consolidated Virginia, the Calumet and Hecla, and many others of our most valuable mines, abandoned their property on the first failure to strike rich ore, we would never have heard of the "big bonanza," whose wonderful riches is so ingeniously illustrated by our San Francisco correspondent in another column.

COMPOSITION AND TRANSPORTATION OF NATURAL GAS.

THE following analyses of natural gas from the Burns, Leechburg, and Harvey gas wells in Pennsylvania, were made recently by Prof. S. P. SADTLER, of the University of Pennsylvania :

	Burns Well.	Leechburg Well.	Harvey Well.
Carbonic Acid	·34	·35	·66
Carbonic Oxide	trace	·26	trace
Illuminating Hydro-Carbons	—	·56	—
Hydrogen	6·10	4·79	13·50
Marsh-gas ($C H_4$)	75·44	89·65	80·11
Ethyl-hydride ($C_2 H_6$)	18·12	4·39	5·72
Propyl-hydride ($C_3 H_8$)	trace	trace	trace
Oxygen	—	—	—
Nitrogen	—	—	—
	100·00	100·00	99·99
Specific Gravity	·6148	·5580	·5119
Calorific Power (Cent. units)	14·211	14·105	15·597
Calorific Intensity (theoretical temperature attainable by combustion in air) (Cent. degrees)	2745°	2746°	2763°

The satisfactory results obtained in the use of natural gas in several of the Western Pennsylvania works—from Erie to Pittsburgh—have been frequently recorded in these pages.

The partial failure, in carrying it through 18½ miles of pipe to MESSRS. SPANG, CHALFANT & Co.'s mill, in Pittsburgh, has not disheartened those interested in iron works there, and, in fact, the difficulty, which was the low pressure at which the gas was discharged at Pittsburgh, suggested the natural and only effective remedy for the trouble, viz., larger pipes and fewer angles in them.

The remarks we have since heard that a higher pressure would be obtained by putting a reservoir at the discharge end of the pipe seemed so ridiculous that we did not suppose it would be seriously entertained; yet the following editorial note, from the *American Manufacturer*, indicates that the same idea still seems to inspire the Natural Gas Company. The italics are ours :

"MESSRS. KIRK & DILWORTH have succeeded in organizing a strong stock company to bring the gas from the Burns and Delamater wells, in Butler County, Pa., to Pittsburgh. The capital is put at $500,000, and will be taken mostly by our manufacturers, ANDREW CARNEGIE being one of the principal stockholders. The distance to be piped is 35 miles, and 6, 8, and 10-inch pipe will be used, *the smaller pipe at the wells, and the 10-inch at the delivery terminus.* Experts claim that the gas of each well is equivalent to 50,000 bushels of coal per day, and experience shows that less than ¼ is lost in transportation for the distance named. This estimate, of course, is in part conjecture, as there have not yet been found instruments to measure so large a flow of gas."

We would suggest, as an excellent preliminary investment for the new company, a little engineering skill to direct their counsels—and if that be a rare commodity in Pittsburgh, let the managers spend a few minutes in considering the effect on the pressure at the delivery end of a garden hose, of putting the nozzle at the faucet from which the water is taken, and leaving the hose open to its full size at the other end. This little experiment, which must be familiar to most of them, would indicate that they are getting things "wrong end foremost" in their pipe line. Would it not be wiser to make their smallest pipe at

least 12 inches in diameter, that they may not find the supply limited when their work is done?

The remarks about the value of the gas in tons of coal are, we need scarcely say, of the wildest, and the estimated loss in transportation is also a mere guess; experience has shown a much greater loss in the case referred to.

THE MARMORA GOLD AND SILVER DISTRICT, ONTARIO, CANADA.

THE enormous profits that have been made in all ages in working good gold and silver mines, has invested that class of mining with a kind of halo, exceedingly attractive to the uninitiated and ambitious capitalist. Probably not one in a thousand of those who invests money in mining enterprises has any personal knowledge of the actual value of his investment; he is guided simply by the opinion of others, in whose skill and honesty he places a confidence which, in the case of undeveloped property, is an example of pure faith that, if exercised in another direction, would certainly merit canonization.

With such abundant opportunity for deception, in addition to honest errors of judgment, it is not surprising that the great majority of gold and silver mining investments prove unprofitable; but the small number of successful mines are so enormously remunerative that they still dazzle and bewilder the inexperienced, and enable speculators and unprincipled stockjobbers to sell worthless property, and finally to bring all mining investments into disrepute for a season, till the discovery of some new "bonanza" turns all eyes in that direction and sets every one again figuring on the profits of gold and silver mining. In this way the cycle is completed.

And yet, with all its uncertainties, mining offers to capitalists, who embark in it, under the guidance of common sense and good judgment, by far the most profitable field that can be found for the employment of money.

It is not necessary to recall the fabulous profits of the silver mines of Peru and Mexico, the gold mines of Brazil, or the "big bonanzas" of our own country; there are innumerable mines that are rarely heard of, being held for legitimate investment and not for stock gambling, which have returned dividends, fabulous in proportion to the capital invested, and quite as great as those so well known to every one as "successful."

The depression in all kinds of business, now so long continued, no less than the better appreciation of the profits obtained in legitimate mining enterprises, is directing the attention of many of our most careful and conservative capitalists to the production of gold and silver; products which have always a sale, that never vary materially in value, and that, with the modern appliances in mining and metallurgy can be produced in quantities, and at a cost, never dreamed of but a few years ago. Where formerly 50 or 100 tons a day was a large output for a mine; with comparatively little addition to the general expenses, 500, 600, and even 700 tons a day can now be extracted, and we see no reason why an ore mine, working on a large vein, should not send up its 1,000 or 1,500 tons a day, as some of our large collieries are now doing. The limit in a well worked mine must always be in the shaft capacity, and that limit is not attained with modern machinery, in mines not exceeding 3,000 feet in depth, at even 1,500 tons a day.

With a large output, ores as low in value as $5 a ton can be made to yield a profit, and those of some of the most remunerative and successful mines in this country, yield no more than $10 a ton. The abundance of the ore, its accessibility, the cost of supplies and of labor, become at least as important questions as the yield of the ore. When we find large veins advantageously situated with regard to the cost of mining and treating, and yielding at the same time an ore of great value, the fact is worthy of note, not by us journalists alone, but by those who have capital to invest, and who desire to put it in a business remunerative in the dullest of times.

Within a day's journey of New York, but thirty-five miles from the shores of Lake Ontario; in a thickly-settled and prosperous district, are gold veins that, for size and richness, compare favorably with those of our richest western mining districts. The first discovery, about eight years ago, of rich, though irregular gold deposits, in the township of Madoc, Ontario, was followed, as is usual, by the influx of a large number of sharps and speculators, who did much, by their exaggerated statements, as well as their swindling operations, to bring discredit on the discovery. Fortunately for the district, the gold refused to lend itself to these moneyless adventurers. These first discoveries were soon proved valueless, but after the excitements had subsided and the reaction had set in which cleared the district of the objectionable classes, shrewd and careful experts continued their researches, and were rewarded by the discovery, in the adjoining township of Marmora, of well-defined true fissure veins, which have since been very thoroughly proven.

The most promising properties were secured by a small number of persons of moderate means, and have since been developed, to the limit of their resources, with very satisfactory results.

The COOK or WILLIAMS Mine has taken out about $30,000 in gold, the ore yielding from $8 to $15 per ton by a very crude amalgamation, a method totally unsuited to this ore. This mine has a shaft over 100 feet deep, and a 20-stamp mill, it is now stopped on account of disagreement between the owners.

The GILLAN Mine has a shaft 60 feet deep on a wide vein. Average ore assayed by Professor CHAPMAN of Toronto, yielded over $130 per ton.

The Toronto Company, we understand, has carried its shafts to a depth of over 100 feet, on a vein about 6 feet in width, in ore of very high grade, running (as we suppose for picked lots) high up into the hundreds of dollars to the ton. This company is now putting up dressing works and other machinery, and promises soon, under good management, to realize handsome returns.

The most extensive developments yet made in this field have been by the Gatling Gold and Silver Mining Company, a corporation owned by a small number of Canadian and American gentleman, who have proven the property, by shafts and tests of the ore on a large scale. There are four gold and silver quartz veins proved in this part of the field, they run nearly North and South in a belt about 350 feet in width.

1. The East vein is opened by four shafts from 14 to 88 feet in depth, and shows over ten feet in width between the walls in deepest shaft.

2. Vein has only surface openings.

3. Vein has two shafts 18 and 30 feet in depth, and it measures three to five feet in width.

4. The West vein is opened by two shafts each 40 feet deep, and it averages five feet in width.

Ore from these veins treated by Messrs. BALBACHS, of Newark, N. J., yielded from $24 to $25 gold and about $4 silver to the ton. A considerable amount of the ore sent to Swansea, Wales, yielded from 1¼ to 3¾ oz. gold, and from ¾ to 2 oz. silver to the ton. These may be taken as representing the average yield of this ore.

The massive ore is mispickel, a sample of which, analyzed by Messrs. JOHN RICHARDSON & Co, of Swansea, yielded as follows:

	Samples marked Rough Ore. Small crystallization.	Samples marked Fine Crystals. Large crystallization.
Peroxide of iron	54·00	56·00
Silica	00·51	00·03
Sulphur	19·03	18·13
Arsenic	25·70	23·00
Nickel	trace.	trace.
Silver	"	6¼ ozs. per ton.
Gold	16¼ ozs. to the ton	157 ozs. "

No free gold could be detected by a strong glass in these samples of mispickel.

We understand that several thousand tons of ore have been extracted by the Gatling Company, and are ready for crushing. The developements here indicated are sufficient to enable experts to form a reliable estimate of the value of this field, which is so near New York that those interested can see and judge of it for themselves; the mines, in fact, are scarcely out of the regular St. Lawrence Summer route.

Samples can be examined by those who are interested in the subject, at the office of Messrs. HAIGHT, No. 2 Wall Street, basement.

Not the least important consideration in regard to this field, is the fact, that in Canada the laws are very favorable to mining interests; there is no tax or royalty on the proceeds of mines; machinery, required for mining uses, is admitted free of duty, and mining properties are required to be assessed, for purpose of taxation, at their value for agricultural purposes.

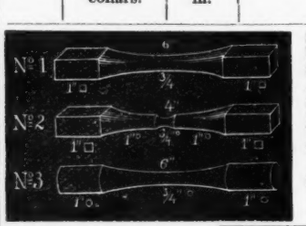
We have taken some pains to make ourselves acquainted with the condition and prospects of this region, and we believe it to be one of great promise, and worthy of the attention of those who desire to embark in legitimate and profitable mining enterprise.

THE EDGAR THOMSON STEEL WORKS.

THE EDGAR THOMSON Stell Works are making an excellent record. On the 13th instant they commenced running double time, and are reported as full of orders.

The following report of tests of their Bessemer rail bar steel shows the admirable quality being turned out. The tests were made by Mr. BRENDLINGER, Engineer of the Point Bridge Company of Pittsburgh:

No. of Test.	Description of Specimen.	Original size and area.	Fractured size and area.	Breaking strength.	Ultimate Tensile Strength per square inch. Original area.	Fractured area.
		Square inches.	Square inches.	Pounds.	Pounds.	Pounds.
No. 1.	Cylindrical 6 in. between collars ¾ in.	.4417 ¾ in.	.277 19-32	49000	49000 / .4417 = 110935	49000 / .277 = 176895
No. 2.	Cylindrical in. between collars. ¾ groves in centre.	1-4 in. ¾ in. grove in centres.	23-32 in. .4057 sq. in.	66000	66000 / .4417 = 149422	66000 / .4057 = 162681
No. 3.	Cylindrical 6 in. between collars.	¾ in. .4417 sq. in.	⅝ in. .3068 sq. in	42000	42000 / .4417 = 95087	42000 / .3068 = 136897



Specimens 1 and 2 were cut from the same bar 1 inch square. Specimen 1 was turned for 6¾ inch round. Specimen 2 was turned 4 inch long, 1 inch round, then in the centre a grove ¾ inch round and ¾ inch round was turned. Specimen No. 3 was from another bar. Specimens were too short to test elasticity.

NOTE.—This was *ordinary rail steel*, and bent nearly double cold.

Respectfully, P. F. BRENDLINGER, Res. Eng.

ATTENTION is called to the advertisement, of the Kings Mountain gold mining property in North Carolina, to be sold at public auction on Thursday, April 6. The mines are said to be in active operation and capable of earning money at the present time.

HOISTING AND CONVEYING MACHINE.

THE accompanying cut represents a convenient automatic machine for hoisting and conveying coal, ores, merchandise, etc., for short distances, such as from ship to dock, from quarries to railroad tracks or wagons, from cuts to fills in railroad work, and for a great variety of other uses which will suggest themselves to every one. The machine is quite simple and strong, is not liable to get out of order, and requires but one man to work it. It has long been in practical use, and the strongest endorsement of its claims is the testimony of those who have used it.

BLACK DIAMOND STEEL WORKS,
PITTSBURGH, PA., January 31st, 1876.

A. H. KING, 115 Broadway, New York.

DEAR SIR:—We are in receipt of yours of the 28th inst., and reply, that the Hoisting Machine suits us in every particular. We cannot say too much in its favor. We have had the machine in use long enough to speak without qualification in its favor.

We know of no other appliance that would so admirably suit the purpose for which we use it. We employ it mainly in hoisting coal from the river, and delivering the fuel to our boilers and furnaces. Respectfully yours, PARK BROTHERS & CO.

LEHIGH AND WILKES-BARRE COAL CO.
Foot 20th Street, East River,
NEW YORK, February 3, 1876.

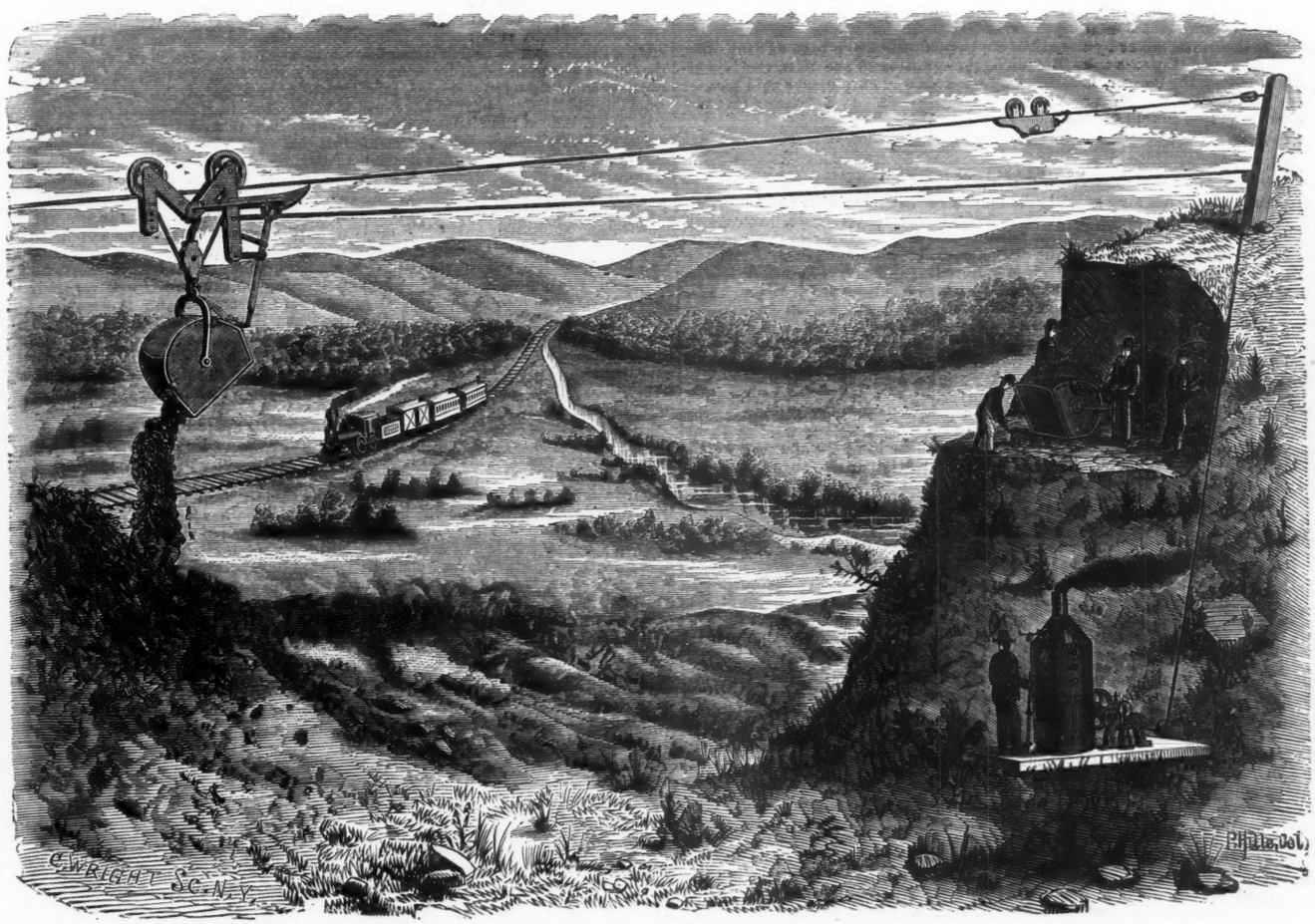
A. H. KING, President U. S. Hoisting and Conveying Co.

DEAR SIR:—We have had in use nearly four years your Hoisting and Conveying Machine. With it our coal is elevated about 50 feet directly from the boats, conveyed nearly 500 feet, and deposited, if required, directly on the floor; one man only being required to operate it. Besides the great saving in time and labor, a large percentage of breakage is avoided, which is particularly important when handling prepared anthracite coal. We regard your machine as a decided improvement over any other method we have seen for hoisting and conveying coal or other material.

Yours very truly, H. L. HERBERT, Agt.
20th St., East River, N. Y.

THE HUNT & DOUGLAS PROCESS FOR SILVER ORES.

TO THE EDITOR: SIR—I have read with pleasure in your journal for March 4, Mr. D. W. BRUNTON'S clear account of the working of the HUNT & DOUGLAS process for silver ores, as applied at Georgetown, Colorado, and your favorable comments thereon, and I take this occasion to clear up some points upon which there seems a slight misconception as regards the nature and mode of conducting the process. You rightly remark that in Mr. STEWART'S practice the HUNT & DOUGLAS bath, containing protochloride of iron and common salt, with chloride of copper, is now used as a chloridizer only, a hyposulphite being employed to dissolve the chloridized silver, and you add "this change in the original process is a very important one." In my own early experiments in this direction, published before the perfecting of this application by Messrs. STEWART & DOUGLAS, ores or mixtures of ores were used containing so little silver and so much copper, that the strong salt bath required to retain the whole of the copper



U. S. HOISTING AND CONVEYING COMPANY'S HOISTING MACHINE.

THE MANHATTAN GAS-LIGHT COMPANY, OF NEW YORK, have their coal yards fitted with wire rope or cables, stretched from side to side, a span of 200 feet, on which the United States Hoisting and Conveying Company's Machines travel. The same machine is used on four fixed tracks or trestles, in their coal sheds. They store at an elevation of 25 feet, an average of 30 tons per hour, or 300 tons in 10 hours with each machine, and one man.

They use a 40-horse power engine to run three machines, each carrying a gross ton of coal. When running one machine, the cost of storing is three cents per ton, if three machines are running on the same engine, the cost of storing the additional 600 tons is only the wages of two additional brakemen, and, possibly, a trifle more for fuel, reducing the cost, to say, 1⅝ cents per gross ton.

The machines are very simple in construction, and not expensive to keep in repair. They have had five in almost constant operation during the past year, and all are in good working order, requiring no repairs.

Such testimony is all that is necessary to say in favor of this ingenious device, and if with it coal can be stored at a cost of from two to three cents per ton, as stated above, it is pretty certain that those having work of a similar nature to perform will investigate the claims of the U. S. Hoisting and Conveying Company's machine.

As shown in the cut, the hoisting rope is fixed to the arm of the Machine on the left side, passes through the hoisting block, over the fixed sheave in the arm of the machine on the right side, thence under the sheave of the trip lever, to a fixed swivel pulley block on the mast, thence to the drum (which is not shown) attached to the engine. The dumping tub here shown, suspended to the hook of the hoisting block, can be removed, and anything else desired used in its place.

For further particulars, we refer to the company, whose address is 115 Broadway, New York. Its business card will be found in our advertising columns.

in solution sufficed also to dissolve the chloride of silver. In the specification of the United States patent (No. 151,763) granted to Messrs. DOUGLAS, HUNT & STEWART, in June 1874, it is, however, said that in the case of ores rich in silver "*the undissolved chloride of silver*" in the pulp, "*may be extracted by lixiviation with strong hot brine or with a solution of hyposulphite of soda.*" In our pamphlet on the process, published a year since, the use of PATERA'S method with hyposulphite is farther explained and recommended as the most economical, so that Mr. STEWART'S present practice is no departure from our original specified process.

You inquire why in Mr. BRUNTON'S account nothing is said of the removal of the silver dissolved in the bath of chlorides. In our specification we recommended that this, as in the Augustin process, be removed by precipitation on metallic copper, previous to the throwing down of the metallic copper by iron. Mr. BRUNTON does not refer to this, but he tells us that in Mr. STEWART'S practice (with ores in which copper is present in insufficient quantity) the copper

is allowed to accumulate in the bath, the density of which does not exceed 15° Baumé. In this case the small amount of chloride of silver held in solution is allowed to remain, while the bath serves to chloridize fresh portions of ore, and only when it is desired to remove the accumulated excess of copper from a portion of the bath is it necessary to precipitate the now small proportion of silver by metallic copper.

A few words in explanation of the action of the HUNT & DOUGLAS baths in this silver-extraction process. Of the copper-chlorides, so useful in chloridizing silver, the cupric chloride is readily decomposed with separation of insoluble inactive oxychloride of copper, by the action of carbonate of lime or of base-metal oxide, such as lead and zinc, which may be present in the ore. The cuprous or dichloride, though stable in presence of these substances, readily absorbs oxygen from the air and is thereby itself converted into a similar inactive oxychloride. The HUNT & DOUGLAS bath of protochloride of iron and common salt not only dissolves, by chloridizing, any oxides of copper in the ore, but at once attacks the oxychloride of copper formed by the reactions just indicated, converting them also into soluble chlorides of copper. In all these cases there is a separation of insoluble hydrous peroxide of iron, and here comes in the action of the sulphurous acid, converting this oxide again into a soluble ferrous salt. The bath is thus, in virtue of these reactions, kept charged throughout the whole process with copper chlorides to chloridize the silver, and with ferrous chloride to chloridize and dissolve any copper oxide or precipitated oxychloride of copper. Hence the recognized efficiency of the process, and its peculiar applicability to silver ores containing base metals. Mr. STEWART in a late letter informs us that the use of our bath following a chlorinating roast, enables him to extract from 97 to 98 per cent. of the silver from such ores. On rebuilding his recently burned works at Georgetown, Colorado, the plan will be specially arranged in all its details to the extended use of our system.

It should be remarked that a previous partial chlorination by calcination with salt, is not indispensable to our process, though recommended for base-metal ores, that is, for those abounding in lead and zinc. For ores containing little or none of these, our specification recommends a calcination without addition, and a subsequent treatment with the bath of ferrous chloride and common salt in the presence of sulphurous acid, with the addition of copper, provided the ores do not contain it; the essential fact of the process being the chloridizing of the silver by the aid of copper-chlorides in a bath of protochloride of iron and common salt, in which, the solution of the iron, and consequently that of the copper, is assured by the action of sulphurous acid gas.

T. STERRY HUNT.

BOSTON, MASS., March 9, 1876.

OUR SAN FRANCISCO LETTER.

THERE has been a strong speculative movement in our mining stocks during the last week, and great excitement prevails on California Street. Except in Imperial and Mexican, nothing has been found in the mines to warrant the sudden advance in prices. In the claims named, some small "stringers" of good ore have been struck, which, it is believed, may lead to important discoveries. The advance in Mexican during seven days has been $18.50 per share, or $1,998,000 for the whole mine. On Imperial there has been an advance of $825,000, or $8.25 per share. As there are only 184 feet in this claim, the advance is greater than it appears at first sight. Those who profess to have, "inside" information, assert that according to the programme of the men who pull the golden wires that set the stock puppets a-dancing, the market has hardly commenced to "boom" yet, in comparison to what we are to see in a few weeks. Where this wild and dangerous gambling is to end I know not, but it is easy to see that the time is near when the financially wounded and dying, will be lying around by the hundred, and over the field of carnage will ride in triumph a dozen or two of the victors, who will then rejoice in the works that their own hands have done.

SILVER GOING DOWN.

The discount on silver is increasing from day to day and cuts down mining profits very considerably. The government bought 300,000 ounces of fine silver recently, from two of our large banking houses at $1.16 per ounce, the sellers paying the cost of parting, making the net price $1.13½ per ounce. As long as purchases can be made at this very reasonable rate, the United States Treasurer ought to be paying out silver for currency just as fast as the coin can be obtained from the mints.

THE CONSOLIDATED VIRGINIA

yield of bullion, for February, was $2,820,000, against $1,802,970 for January. The daily product of ore is about 750 tons of 2,000 lb., making for a month of 30 days 22,500 tons, of the value of $125.33 per ton.

A few items about this noted mine may be interesting. It covers 710 feet of the Comstock lode, and is incorporated with 108,000 shares of $100, making the par value $10,800,000. At the present selling price of $465 per share, the mine is worth $50,220,000. Including a $10 dividend for February just declared, the returns to the shareholders have been $16,200,000, or $150 per share. The whole assessments levied upon the mine were only, $411,200. A piece of surface ground over the bonanza which this mine contains, say 710 feet in length by 400 feet in width, would give only a fraction over 6½ acres, and each acre in virtue of the treasure underneath it, would be worth $7,726,153, which would be $1,596.25 per square yard, $177.36 per square foot, or $1.23 per square inch. Unless it be in the center of the English metropolis, this is probably the most valuable land by the acre that is known.

It is necessary for me to say, however, that the Comstock mines, though bought from the Government at $5 per acre, are not limited by their surface lines.

A lode must have surface in order to be patented, but the lode itself may be followed any distance outside of the patent lines. To persons not acquainted with mining laws and customs this may seem a paradox, but it is true notwithstanding. The expense of running such a mine as the Consolidated Virginia, is necessarily great. During 1875 the cost of wood, lumber, and timber was $285.437; hoisting the ore, $8,382; milling expenses, $2,198,236 or about $13 for each ton of ore reduced; freight on bullion, $56,383; discount on bullion, $640,715 or $3.79 per ton of ore; salaries and wages, $760,698; half the cost of opening a new shaft, $201,981. The total mining, milling, and other expenses came to $26.78 per ton of ore extracted, and the shareholders received out of the year's product $72.17 per ton, the grade of the ore being $98.95. An increase of 25 per cent. in the value of the ore will add very largely to the product of the mine for this year as compared with last, besides the milling capacity has been largely increased.

In early times on the Comstock, when Gould & Curry was selling at $6,000 per foot along the lode, many persons thought the rate absurdly extravagant. At its price, a foot of the Consolidated Virginia Mine is worth $70,732.40; an inch is good for $5,894.36; and for the sixteenth part of an inch the buyer must pay $368.39. For every $50 invested in this wondrous mining property, the holder can, at the present price, depend upon his owning a piece of the Comstock lode about equal to the thickness of a sheet of writing paper. But considering the fact that the sheet is several hundred feet in depth, by 200 feet in width, not to speak of what may yet be found, and that it consists of nothing but rich gold and silver ore, it is certainly well worth the money.

THE LITTLE EMMAS OF LONDON.

There are two ideas which the Emma Mine agitation naturally suggests—1st. That the Emma lode was sold to the London purchasers at a price far beyond its actual value; and, 2nd. That while the shareholders who have lost money by the purchase of stock in the company, deserve sympathy, those of them who, along with the Directors, preferred whimpering to working, have fairly earned the contempt of experienced miners.

Of the former fact I have nothing to say exculpatory of the parties who, by misrepresentation and keeping back the truth, realized more than the value of the property, but it ought to be remembered, that the swindle, if it was such, was perpetrated through the agency, and by the business device, of an Englishman, and not by an American. Without the aid of Baron GRANT, the American operators were very harmless persons in London. Indeed, it is not altogether improbable, that PARK and STEWART had no adequate conception of the immense value of the mine, as a speculative bait, until they got a glimpse of GRANT'S grandly furrowed foot, and looked with ecstacy on the dual evidence of his extraordinary powers pointing upwards from his brow. It is childish to lay all the blame on the venders, while it is plain that the buyers were either incapable of managing their own affairs, or were parties to a wrong perpetrated upon the English public.

I have a little to say about the Emma Directors. The mine, it will be remembered, was very productive for a year after the organization of the company, and during that period liberal dividends were paid, but a "fault" was encountered and the ore came to an end. In place of going vigorously to work in recovering the lode, either below or beyond this line of dislocation, the Directors, after a little hopeless and meaningless work, seemed to come to the conclusion that more was to be made by crying piteously over their wrongs, and claiming redress from the stony-hearted and bloodless venders of the mine, than by working it. They appear to have decided that those fearfully sharp Americans who had deceived their accomplished experts, had picked their pockets, and, worst of all, had concealed the terrible fact that poor little Emma had a deep-sealed ruinous "fault," could be made to disgorge the ducats they had received, if they, the Directors, dear good souls, would only whistle a nice little legal tune in New York City specially for their benefit. Strange it is that these London wiseacres did not know their men better than to have faith in the efficacy of any such little pastoral comedy as that, even if played by metropolitan actors. If the manly Directors of the Eberhardt and Aurora Company of London had acted like the Emma Directors, its bankruptcy would have been the inevitable consequence. But in place of whining on the housetops over their grievous wrongs, and blaming every person save themselves for the unfortunate position in which they stood, the Eberhardt Directors sent Captain FRANK DRAKE to White Pine to develop the company's mines, and DRAKE, with the persistency of a skilful American miner, did his work so effectively that the shareholders became jubilant over their good fortune. Truly they were fortunate in having sensible directors and a mining manager whose faith, judgment, and energy were equal to the occasion.

I do not believe that the Emma mine is dug out by the roots. The company, after scratching a few holes on the surface, found some wise man who declared that there was nothing more to be done, and the directors regarded him as an infallible guide.

Only a few years ago there were men of the same stamp who could tell us, with unerring sagacity, that the great Comstock lode was entirely exhausted. I remember being told in 1868, by the then Mineralogist of the State of Nevada, that the Comstock lode had become hopelessly unproductive, and that the inhabitants of Virginia City and Gold Hill would only be too glad to move out to White Pine to extract its rich surface ores. If the bonanza mines had, unfortunately, fallen years ago into the hands of Englishmen like the Little Emma Directors, it is safe to say that no discovery could have been made of any magnitude. A few holes would have been gouged one or two hundred feet below the surface, and then no ore being found, the mines would have been abandoned in disgust.

The Emma Company was incorporated with 50,000 shares of the value of £20, or in all $5,000,000. The dividends paid were $18 per share, making the total $900,000. At present the stock is worth $750,000 in the London market, being at the rate of $15 per share. If the mine is worthless, why do the Directors continue to swindle the public by selling the stock at such a price? They ought to wind up the concern, and keep innocents from being duped.

NOTES.

We are having very rainy weather, and besides the certainty, almost, of an immense wheat crop being obtained, we can depend on a very abundant harvest of gold from our Californian mines. There is a rapid increase in the production of quicksilver on the Pacific coast, and a slight advance in the price would be the means of extending mining operations to any necessary extent.

There is little copper ore offering for sale at present, but it is believed that during the coming summer the consignments will be large. Although there are many promising antimony mines within easy reach of this city, there are two smelting works here standing idle for want of ore. If they were owned by men of means and enterprise, they could be kept in full operation.

SAN FRANCISCO, March 6, 1876. J. D. EMERSLEY.

ANTHRACITE AT THE CENTENNIAL.—We understand that the D. L. and W. Railroad Company will take a part in having the anthracite industries of Pennsylvania fully represented at the Centennial Exposition. The Reading Railroad Company also contemplate sending a complete cross-section of the mammoth coal vein in the Schuylkill Region. Mr. REESE, Superintendent of the district, has been working on it for a long time, and now his labors are nearly completed. The coal is to come from the Plank Ridge Shaft, and is to consist of a shaft three feet square and the full thickness of the vein, showing the intervening slates and all the different benches. It will, in all probability, when finished, be about forty-five feet through. It is to be taken to the Exposition grounds in separate pieces, and there placed in position. The manner of showing them will be to have erected a column of four iron corners, in which the pieces of coal will fit, being lowered in from above. First will come a portion of the bottom slate, then the seven foot bench, and so on up to the top rock.

PRODUCTION OF QUICKSILVER AT NEW ALMADEN FOR TWENTY-THREE YEARS AND THREE MONTHS.

DATES.	CLASS AND QUANTITY OF ORE.			Total Pounds.	Flasks from Furnaces.	Flasks from Washings.	Flasks, Total.	Average amount per Month, Flasks.	Percentage, including all.	Percentage, Tierras.	True per cent. of Ore ex'ld. Tier. and Wngs.	No of Months.
	Grueso, Pounds.	Granza, Pounds.	Tierras, Pounds.									
July 1850 to June 1851				4,970,717	23,875		23,875	1,989½	36·74		36·74	12
July 1851 to June 1852				4,643,290	19,921		19,921	1,660	32·82		32·82	12
July 1852 to June 1853				4,839,520	18,035		18,035	1,503	28·50		28·50	12
July 1853 to June 1854				7,448,000	26,325		26,325	2,193¾	27·03		27·03	12
July 1854 to June 1855				9,109,300	31,860		31,860	2,655	26·75		26·75	12
July 1855 to June 1856				10,355,200	28,083		28,083	2,340¼	20·74		20·74	12
July 1856 to June 1857				10,299,900	26,002		26,002	2,167	19·31		19·31	12
July 1857 to June 1858				10,997,170	29,347		29,347	2,445½	20·41		20·41	12
July 1858 to Oct. 1858				3,873,085	10,588		10,588	2,647	20·91		20·91	4
Nov. 1858 to Jan. 1861	Closed by Injunction.											
Feb. 1861 to Jan. 1862				13,323,200	32,402	2,363	34,765	2,897	19·96		18·64	12
Feb. 1862 to Jan. 1863				15,281,400	39,262	1,129	40,391	3,366	20·22		19·65	12
Feb. 1863 to Aug. 1863				7,172,660	17,316	2,248	19,564	2,795	20·86		18·46	7
Sep. 1863 to Oct. 1863				2,346,000	4,820	700	5,520	2,760	18·00		15·67	2
Nov. 1863 to Dec. 1863	54,800	1,586,500	718,000	2,359,300	4,040	407	4,447	2,223½	18·65	3	17·52	2
Jan. 1864 to Dec. 1864	2,259,400	18,730,300	3,287,900	23,277,600	42,176	313	42,489	3,540¼	13·96	3	15·64	12
Jan. 1865 to Dec. 1865	2,288,900	25,749,000	3,910,500	31,948,400	47,078	116	47,194	3,933	11·30	3	12·42	12
Jan. 1866 to Dec. 1866	1,506,000	19,939,100	5,440,200	26,885,300	34,726	424	35,150	2,929	10·00	3	11·62	12
Jan. 1867 to Dec. 1867	731,500	15,689,288	9,603,145	26,023,933	23,990	471	24,461	2,038¼	7·19	3	9·42	12
Jan. 1868 to Dec. 1868	2,274,208	14,566,600	12,564,722	29,405,530	25,577	51	25,628	2,135⅔	6·66	2	10·12	12
Jan. 1869 to Dec. 1869	150,000	11,942,175	13,366,000	25,458,175	16,898		16,898	1,408	5·07	2	8·48	12
Jan. 1870 to Dec. 1870	30,000	12,531,900	8,535,800	21,097,700	14,423		14,423	1,202	5·23	2	7·42	12
Jan. 1871 to Dec. 1871		13,661,700	8,373,000	22,034,700	18,563	5	18,568	1,547⅓	6·44	2	9·16	12
Jan. 1872 to Dec. 1872	142,000	12,777,000	8,497,600	21,416,600	18,391	183	18,574	1,548	6·63	2	9·57	12
Jan. 1873 to Dec. 1873		8,492,375	8,838,000	17,330,375	11,042		11,042	920	4·87	2	7·86	12
Jan. 1874 to Dec. 1874		11,294,000	12,160,000	23,454,000	8,867	217	9,084	757	2·96	1·59	4·29	12
Jan. 1875 to Dec. 1875		12,236,000	18,870,200	31,106,200	13,541	107	13,648	11·37⅓	3·35	1	6·92	12
Totals and Averages	8,436,808	179,195,938	114,165,067	406,457,255	587,148	8,734	595,882	21·35¾	11·21	1·99	14·58	279

Product of Enriqueta from 1860 to 1863 10,571

Total product of all the Mines on the Company's Property.....606,453 flasks, of 76½ lb. each, or 46,393,654½ lb.

—San Francisco *Scientific Press*.

closed for want of further credit. I think these last found it a profitable investment, as they sold large quantities of concentrated ores at good prices, while their deferred payments included wages, board, drinks, rental, materials, etc. As regards the results of concentrating: The ores shipped averaged over, 60 per cent. lead and 20 oz. silver. It was claimed that the loss in lead was very low, and the loss in silver very high. Judging from the assays made of a very large number of samples, which were those used by Mr. SEWELL in his report recommending the building of the works, this could not be the case, as those assays showed the galena to be the silver-bearing mineral, consequently a large loss in silver must be accompanied by a proportional loss in lead. This I found, upon examination, to be the case, for a man named MITCHEL erected some "setz siebe" a quarter of a mile down the cañon for the purpose of working the tailings from the upper mill. As long as the mill ran he had a profitable business. His product consisted principally of about 2 mm. stuff, the fall in the cañon at this point being sufficient to carry such particles in the water current.

A difficulty that the mill had to contend with was, that our smelters did not know enough to roast the concentrated ore, and it blocked the furnaces, when used raw, by adhering to the walls in the upper part of the furnace. On this account it had to seek a market outside of Utah, and the most of it was shipped to Pittsburgh. Lack of competition lowered the price, and, of course, diminished the profits.

I think the works might have been improved, had they not to carry unnecessary capital invested in express charges on full-size working models, on unnecessarily large and expensive buildings. The height of the main jig building must be over twenty feet, the jigs, counter-shafting, etc., utilizing ten feet of this. The introduction of the old-fashioned jig, requiring the stoppage of the machine to remove the galena from the screens, instead of using the automatic discharge. Then the runs were laid so flat as to require constant attention to prevent clogging. The two last require unnecessary labor; in fact, useless labor seemed to be the most obtrusive fault. The works were built on the mine which lies near the head of Main Bingham Cañon. This has two objections. Lying so near the head of the cañon the water supply is small and uncertain—in Summer, from drought, in Winter, from frost. Secondly, its location cuts it off from nearly all the mines in the cañon, so the works are entirely dependent on the mine. Had the mill been built three miles below, an abundance of water could be had the year round, the cost of delivering the ore from most of the mines would not exceed 50c. per ton, and the mill could have been kept busy all the time on custom-work, and made some money for the owners.

The product should not have averaged higher than fifty per cent. lead, formed by mixing first class, over sixty per cent., and second class about forty per cent. lead. In this way, the losses which occur when stuff is concentrated very closely, could have been partially avoided, and, as nobody analyzed their ores, but worked the furnaces by guess, the relative value of the product would not have been changed.

It is to be hoped some one will take hold of these works, for it would greatly benefit the camp. If there was not enough of these works, I think a complete outfit of KROM'S Concentrators (bran new) could be had, cheap for cash. I do not recommend these last, however, for it seems to me that if the owners had as much faith as they profess in their system, they would not have used their large brick mill merely as a storehouse for their machinery. From what I have seen of KROM'S Concentrators, I think them practically perfect, but not perfectly practical.

Contracts have been let for the construction of another section of fourteen miles of the Utah Western Railroad. This will bring it within a mile of Stockton, and do much to help that part of the country. S. C.

UTAH MINING INTERESTS.

Special Correspondence of the Engineering and Mining Journal.

SALT LAKE CITY, March 5, 1876.

TO THE EDITOR: SIR—Shipments of Cottonwood ores have fallen off during the past fortnight. Small lots have arrived from the North Star, Highland Chief, South Star, and Winsor Mines. This is, I believe, the first lot of ore from the Winsor consolidation shipped this winter. This group, consisting of the "Last Chance," "Hiawatha," "Savage," and "Montezuma" Mines, lies in the dolomite, the most prolific ore-bearing strata of the Cottonwoods, near the top of Emma Hill, and was at one time considered as only second to the Emma and Flagstaff. The veins were narrow, but the ores rich in silver. In 1872 they were sold to a Michigan Company, and ore shipments continued for a year, when, the ground looking unfavorable, the company became discouraged, and work almost ceased. A few months back the mines were leased to miners who have opened up some good ground, the ores sampling about 95 oz. silver per ton. The "Grizzly" has been sledging ore down to Alta, where it is made up into 50 or 100 ton lots, for shipment to market. The first lot is expected down this week. The suit between the "Richmond" and "Theresa" mines is now being tried. The case has only a local interest, there being no important principle at stake. The mines were located about 30 feet apart, on the same vein, and within twenty-four hours of each other. Thus the question is merely as to priority of claim.

This case is, in one point, analogous to the Emma vs. Illinois Tunnel suit, wherein Chief Justice MCKEAN decided that mine owners could follow their vein on its course outside their patented surface ground, they being entitled to the whole number of feet on their vein called for in their location notice. Both the Richmond and Theresa's patent lines cross the vein obliquely but neither have raised the question in the main suit, Judge MCKEAN'S decision being accepted as the law in the case. The ore buyers have had considerable interest in the settlement of the case, one way or another, since during its progress, injunctions, and counter injunctions, have stopped ore shipments. In the hands of either party these mines (or mine) can readily yield thirty (30) tons of ore a day assaying 30 to 40 oz. silver and 30 to 50 per cent. lead. The ores from Cottonwood continue to sell for $1.15 per oz. silver on a basis of from 25 to 30 per cent. lead.

Owing to the increased output of the Montreal and Nez Perces Mines, ores from Bingham are more plentiful than ever. Notwithstanding this, prices seem to be stiffening. A lot of Yosemite ore, containing 12 to 15 oz. silver and 50 to 55 per cent. lead was sold last week, at $1.05 per oz. Silver on 25 per cent. lead, with 50c. added for each unit under 50, and $1.00 per unit over 50 per cent. This rate will not be maintained but will have the effect of advancing prices a little all along the line.

Owing to the enormous masses of very low grade ores in Bingham, the capacity of the camp will not be reached until proper concentration works are built. These very low grade ores, *i. e.* containing 3 to 10 oz. silver and 5 to 20 per cent. lead, contain such large percentage of silica as to render the profitable treatment in furnaces impossible. The first concentration works built were those of the "Utah Silver Lead Company." Their mines showed large bodies of galena, zinc blende, iron and copper pyrites assaying from 6 to 17 oz. silver, according to the preponderance of galena in the mixture; the pure galena assaying 23 to 33 oz. silver. The different minerals were not very intimately mixed nor very finely divided, which obviated the necessity of fine crushing and consequent production of a large percentage of slimes. Mr. LONGMAID was sent out from England to build the works. The English directors, with characteristic forethought, sent out some jigs and buddles complete, and, to insure their early and safe arrival, had them sent by express. These were used as models, after which the remaining machines were built. The works, as completed, consisted of a double horizontal engine, small Blake breaker, one pair ten-inch rolls, an elevator for returning coarse stuff to the rolls, ten jigs, two rotary buddles, prying kiln, and settling vats. The cost, exclusive of the engines and breaker, which were on hand, was about $35,000. The company ran the works one season and then stopped on account of financial unsuccess. The following season they were leased by a Salt Lake firm, who ran them for a year, and then

RICHMOND, VA., COAL TRADE.

Special Correspondence of the Engineering and Mining Journal.

TO THE EDITOR: Sir—The coal trade of the city of Richmond may be divided into four distinct areas of supply, but in the sale, there is such a co-mingling that details are not attempted, hence the difficulties and discrepancies that always accompany the reports made for publication.

The first area in my proposed classification is the northern portion of the Richmond coal basin, which lies fourteen miles west of the city and north of the James River, in the county of Henrico.

This area produces the celebrated "carbonite," or natural coke, which is such a favorite fuel with those who know its qualities that the market price, per ton, is always one dollar over the anthracite and Western coals, and from the experience I have had using it in bed-room and office, I do not hesitate to pay the difference, as others do.

The quantity supplied does not equal the demand, and the cause can be attributed to non-production and not want of transportation, for a canal, with boat capacity of seventy tons, passes through this basin and delivers the coal cheaply into the city basin for city use, or into the ship basin for exportation.

A railroad two-and-a-half miles in length connects this coal area with the Richmond and Fredericksburg Railroad, and seven miles on that road or nine-and-a-half from the colliery puts the coal into the city of Richmond.

The second area is a portion of the same Richmond coal field lying south of the James River, from twelve to twenty-five miles southwest of Richmond, in the county of Chesterfield.

At present only one colliery is worked south of the James River, the product of which is shipped by river and canal to Richmond, the remainder is sent by rail, and thus far no reliable seam of carbonite has been found south of the river.

At Coalfield Station, on the Richmond and Danville Railroad, there are several "pits," or small collieries, now producing coal, and the Midlothian Colliery, on a much larger and more perfect plan, is now ready to commence shipping coal under the management of OSWALD J. HEINRICH, and from the completeness and perfection of the "Plant" as designed, but not yet fully completed, we may hope to see the coal trade of Richmond take a position on the producing and shipping list of your journal, more in accordance with the value and extent of the field and its unrivaled advantages of position.

Clover Hill coal pits are twelve miles south of the Midlothian pits in the same Richmond basin, they have been extensively worked and have produced much coal, but the amount is not easily obtained.

The company have constructed a railroad twenty-two miles in length, connecting the mines with ship navigation on the James River, near the Dutch Gap Canal, about fifteen miles below Richmond.

At sixteen miles the road unites with the Richmond and Petersburg Railroad, which is twenty-two miles in length, at a point equi-distant from Richmond and Petersburg, making the distance from the collieries to either city by rail twenty-seven miles.

The company is greatly embarrassed and its entire property is worked under a "receiver," and to make sale for coal, badly prepared and carelessly handled, is offering it at very low figures and yet finds no sale.

The third district is that of West Virginia, which reaches the city and the shipping wharves *via* the Chesapeake and Ohio Railroad, from a distance of from three hundred to three hundred and sixty miles.

The amount of business over this road is small and very unsatisfactory, but that is the effect of stagnation of business generally and not from local causes. Therefore, this district must await the general renewal of business throughout the country.

The fourth district is Alexandria and Baltimore, the shipping ports for the Cumberland and Pennsylvania regions.

This is the most aggressive and persistent division of the trade coming by water in the free and open rivers and bays; it is not hampered by tolls, furnishing more in quantity and of better quality, as a general rule, than the other three areas combined.

There are no facilities at Richmond for cheap and rapid handling of coal, and until these facilities are provided, Richmond merchants can never expect to do an extensive coal trade, or furnish cheap fuel to her citizens. M. C.

RICHMOND, VA., March, 1876.

SHRINKAGE OF PIG IRON.

TO THE EDITOR: SIR—The Journal of Feb. 26th publishes a discussion on the "shrinkage of pig iron" in which Mr. METCALF is reported to have said, "As a rule, the strongest irons showed the greatest strain on cooling, and were, hence, more liable to crack than those that were cold short."

The writer has for many years observed in foundry practice, what Mr. METCALF has correctly stated, the great liability of castings, made of the strongest cast iron, to crack at the edges or the parts first cooled.

I think, however, the cause of the fracture suggested by Mr. M., is not the correct one. The term "red short" doubtless suggests the true cause, that is, insufficient strength or tenacity, when at a high red heat, to stand the strain produced by the unequal time of cooling of the different parts. The fractures doubtless occur immediately, or very soon after the metal congeals.

The writer has handled a number of tons of cannon bronze, and was impressed with the extreme red short property of that very tough alloy.

The tendency of railroad wheels to tear on the rapidly shrinking chilled surface is another example of the "red short" feature in the strongest cold blast pig iron. The inequality of shrinkage between the first and last cooling parts of the same casting, will differ so little in strong and weak irons, that it could not properly be taken into account, in considering the tendency to fracture.

The difference in the red short property as shown between strong and weak iron, and also between iron and cannon bronze, suggests the question, is not this red short property associated with the highest strength in cast metals generally?

To get light on this particular question is the main object of the writer in bringing this subject before the many intelligent readers of the Journal.

CINCINNATI, O. R. D. MOORE.

BRITISH IRON TRADE ASSOCIATION.

THE following Provisional Rules and Regulations of the Association were adopted, at a recent meeting, for the government of this Association, until February, 1877, when a code of rules and by-laws for permanent use are to be adopted. The Association is organized on the plan of our American Iron and Steel Association, and, like it, will confine itself to trade questions, leaving the scientific and metallurgical questions to the Iron and Steel Institute.

"1. The general objects of this Association are:—

To secure a means of communication between members of the iron and steel trades of Great Britain, upon all matters bearing upon the commercial interests of these industries.

To procure and circulate detailed statistics of the iron and steel trades both at home and abroad.

To attend to all matters connected with foreign tariffs, commercial treaties, and home Parliamentary business, that may have a bearing upon the position of the iron and steel trades—excluding questions affecting the regulation of wages or of a purely local character—and generally to take all proper measures for advancing the interests of the British iron and steel trades in their various branches.

"2. All persons, firms, and incorporated companies connected with the iron and steel industries in the British Islands, Colonies, and Dependencies, may become members of the Association, subject to such payments and by-laws as may from time to time be approved by the General Council. All persons, firms, or companies signifying their intention to become members on or before 31st March, 1876, to constitute the original members of the Association; after that date all admissions to be by a majority of votes of the Managing Council, and a form of application for membership will have to be made in due course, and signed by three members of the Association. Each person, firm, or company is only to be entitled to one vote at any meeting of the Association. Incorporated companies must be represented by one of their officers or by a member of their Board duly appointed for the purpose.

"3. The affairs of the Association shall be conducted by a Board of 36 members, to be chosen at the annual meeting, due regard being had to the prope representation of the various iron and steel making districts. The elections to the Board to be made in accordance with by-laws to be laid down. The Board shall have power to fill up any vacancies that may occur. They shall also elect from their number a President, Secretary, and Treasurer; and five members shall form a quorum of the Board.

"4. The Association shall meet in February or March. Special meetings may be called by the Board or by the requisition of not fewer than ten members of the Association.

"5. The Board shall, at the annual meeting to be held in February or March in each year, submit a report of their proceedings for the past year, and a statement of accounts, duly audited.

"6. The Board shall have power to make such by-laws as may be deemed necessary, provided they are not inconsistent with the general objects of the Association.

"7. These rules to continue in force until the annual meeting in 1877."

SOME NOTES ON ELECTRO-METALLURGY.*

By N. S. Keith.

(*Continued from Page* 254.)

IT is proposed to cover steel wire of great tenacity with sufficient copper electrically deposited to protect the steel from oxydation, and to increase its electric conductivity. A mile of steel wire, weighing 130 pounds, covered with 36 pounds of copper, has the conductivity of the same length of ordinary telegraph wire weighing more than twice as much, and can be afforded at about the same price. It is claimed that such prepared telegraph wire is more durable, and by reason of less weight, requires fewer poles and less expense in placing. Iron and steel wire can be covered with copper of any desirable thickness more cheaply by electric deposition than in any other way; not even excepting the immeasurable thin film resulting from dipping in solution of copper sulphate. By the dipping nothing more than a film can be had, and the copper deposited costs from 36 to 40 cents per pound without counting the waste.

There have been various plans proposed for the treatment by electricity of ores for the extraction of their metallic contents. They have been chiefly characterized by a display of ignorance of the laws governing electricity and electrolysis. I may mention efforts to collect the precious metals by strongly heating the ores and minerals constituting the matrix, and endeavoring to establish a current of electricity through the pieces, intending to bodily move the particle of metals to one point. But a few years ago pieces of rock were soberly, I will not say honestly, shown with a globule of gold and one of silver, upon one side of each piece, which were said to have been collected at those points by electricity from their diffused condition in the matrix. Any one acquainted with the laws of electrolysis would at once brand such a scheme as fraudulent, as the proper conditions of the matter thus to be treated were absent. These were the conductivity of the material, the fluidity of the metals and matrix, and the chemical combinations of the metals with electro-negative radicals.

Another plan proposed and patented, possessed of some little merit, was to treat the powdered ore in a solution of potassium cyanide, making the containing vessel the anode, and a properly suspended sheet of metal the cathode where the gold and silver was to be deposited. The ore was continually stirred. As the success of the process evidently depended upon an accidental and momentary contact of the particles of gold with the anode it failed. Beyond this consideration it was not necessary for the investigator to go. It was claimed by the inventor that the solvent, a solution of potassium cyanide, dissolved the particles of gold even though not in contact with the anode, by reason of being electrically excited; but such is not the fact.

Another plan by the same inventor ranges upon an iron shaft passing through an amalgamating barrel alternate disks of zinc and copper, forming something resembling a voltaic pile. The claims are that the mysterious, unexplainable electricity generated acts in an equally mysterious way its wonders to perform in the way of hastening and otherwise promoting amalgamation. In this case I fail to see where he gets more than a local current of electricity, if even that, which cannot possibly influence amalgamation. This is matched by the quack doctor who professes to pass constant electric currents through portions of the human body by bringing in contact therewith chains or belts consisting of alternate and overlapping scales of zinc and copper. "Electricity is life," says the quack, "and applied to the body must be beneficial." There are quacks in all professions; unfortunately, their expressions often go further and count for more than the opinions and works of honest and talented men. The concealment of fraud and ignorance behind the shield of mystery has been too often the lever used to move schemes of mining and metallurgy, to the detriment of honest workers in the field.

It has been proposed to deposit copper from mine waters containing copper sulphate, and from cupriferous waters resulting from lixiviation of roasted copper ores, by electricity, instead of by reduction by iron. I doubt the practicability of such a process, for several reasons. In the various cases to which I have referred as successful process of copper electrolysis, there have been the following indispensable conditions: solutions sufficiently charged with copper salts and sulphuric acid to be good conductors of electricity; soluble copper anodes, which, by dissolving, keep the solutions constant in composition, and sufficient cathode surface to receive the deposit. Under these conditions, the electromotive force needful for the deposition of the metal is at the minimum only sufficient to overcome the resistance of the circuit being necessary. Cupriferous waters from mines and lixiviation are necessarily so dilute as to be poor conductors. The anodes used must be insoluble, and, for that reason, poor conductors. The cathode need not offer more resistance than in the other cases. As the reduction goes on, the solution decreases in conductivity, requires more and more electromotive force to overcome the increasing resistance, continually increasing the cost of the current. In one case, the cost is scrap iron, and the returns copper and iron sulphate, *two* marketable products. In the other case, the cost is power, and the return copper, but one marketable product.

By many persons electricity has been considered an entity, somewhat intangible, but still a potent fluid flowing through conducting substances from the positive to the negative pole of the battery, effecting changes in its course manifested in various ways in different conductors. Thus it heated wires, dissolved

* A paper read before the American Institute of Mining Engineers, at the Washington meeting, February, 1876.

metallic anodes of electrolytic baths, deposited metals at the cathode, decomposed water, etc. It made iron inclosed within a spiral circuit magnetic in a mysterious way which the fluid theory could not account for. There was also the two fluids theory ; one fluid flowing one way and the other in the opposite direction. These were called positive and negative currents. SMEE, in his work on Electro Metallurgy, set forth laws which he thought governed electrolysis deduced from the facts within his knowledge as he understood them. With increased number of facts, advancement in scientific knowledge and theory, and changes in chemical and physical sciences, have come changes in electric science. Now, instead of the belief in one fluid passing in one direction, or in two fluids moving in opposite directions, we have the theory of the electric polarization of molecules. We cannot determine absolutely what that condition of matter which we call electricity is, but the theory which agrees with the greatest number of facts states it to be molecular polarization and disruption, though I think this latter term defines electrolysis simply.

The fundamental proposition is that all matter is endowed with an amount of force specific to each element. This force has been called latent heat and potential of matter. The manifestations of the existence of this force are called heat, cohesion, adhesion, affinity, electricity, etc., according to the observed effects of its motion. These manifestations can be called the conditions or states of matter. If we change matter from one of these states to another, force is either absorbed or set free. If set free it is immediately absorbed by some other form of matter. Electric polarization is the condition of matter in which the atoms or radicals composing a molecule repel each other and seek combination with other atoms or radicals. Force is absorbed in setting up this condition, but is given off as soon as opportunity offers. All matter offers resistance to electric polarization, varying specifically with the affinity which the atoms composing the molecules have for each other. The metals offer the least resistance, then solutions of salts, and lastly rocks and vegetable matter. Silver and copper are the easiest to polarize and are the best conductors.

Analysis imprisons force, synthesis sets it free, and it manifests itself as heat, electricity, etc., according to its surroundings. If into a vessel containing a dilute solution of sulphuric acid we place a piece of zinc, the synthetic action, or chemical combination of zinc with sulphuric acid develops heat, a manifestation of the force set free. Hydrogen is given off from the surface of the zinc. Touching the piece of zinc place a piece of copper and hydrogen will be given off only from the surface of the copper, but with increase in quantity as well as increase in heat in a given time, but the same for a given amount of zinc dissolved. If we amalgamate the zinc and place it alone in the liquid it will not be affected, and in contact with the piece of copper it will dissolve and hydrogen will be given off from the surface of copper, and the liquid is still heated. This is force as heat from synthesis. Attach to each piece a short piece of platina wire ; join the ends of the wire outside of the liquid and the wires become heated, while less heat is imparted to the liquid. This is force as heat and electricity as a result of synthesis. Separate the ends of the wires and introduce them into a second vessel containing dilute sulphuric acid as before, and immediately, from the wire attached to the copper, oxygen will be given off, and from the wire attached to the piece of zinc hydrogen will arise. Thus is force manifested as electricity in analysis, or the separation of the constituents of water. This analysis in the second vessel absorbs the force set free by the synthesis in the first vessel. It is work done by force as electricity. As the old axiom has it, "action and reaction are equal," so for each equivalent of zinc which combines with the sulphuric radical SO_4 in the first vessel, an amount of force is set free which is again absorbed by an equivalent of hydrogen which is set free from its combination with a sulphuric radical in the second vessel. The transmission of this force is by polarization, and has the name electric current. The equivalents in the case are not the chemical ones, but the electrical, they being of a value of the chemical equivalent, divided by the valency of the element or radical.

If now we use copper in place of platina wires when the ends are placed in the acidulated water of the second vessel, oxygen will no longer be given off from the positive pole, but instead the wire will dissolve, though hydrogen will be set free at the negative pole until a quantity of copper has passed into solution, and then in place of hydrogen copper will be deposited. Here we have an electrolytic bath of copper.

It may be asked why, if an atom of copper or one of hydrogen possesses an amount of force equal to that of an atom of zinc, the forces do not balance each other, and no action take place in either cell? Chemical affinity determines this. Though no more force as heat or electricity can be had from the oxidation of an atom of zinc than from the oxidation of an atom of copper, the greater affinity which zinc has for the negative radical SO_4 determines the electric polarization of all the molecules of matter within the circuit composed in this case of the piece of zinc, the dilute acid and the piece of copper in the first vessel, the wire leading therefrom into the second vessel, the solution therein, and the wire leading therefrom to the piece of zinc. The polarization is the result of the combination of atoms of the electro-positive metal zinc with the electro-negative radical SO_4 of the molecules of the acid H_2SO_4 in contact with the zinc. The electro-positive atoms hydrogen are set free in contact with the electro-negative metal copper. All of the intervening molecules of acid and water are polarized by a force which tends to disrupt or force them apart; the positive atom or radical of each molecule attracting the negative atom or radical of each adjacent molecule, and *vice versa*, like the attraction which the North Pole of one magnet has for the South Pole of another. At the surface of the zinc the adjacent molecules of acid under the tension set up by affinity are disrupted; the negative radical SO_4 combines with the positive atom of zinc, leaving the positive hydrogen to combine with the negative radical of the next molecule in the chains of molecules between the two metals, and so on to the copper where atoms of hydrogen being set free and not combining with copper, arise as gas. These polarizations and disruptions follow each other with inconceivable rapidity. The molecules of the conducting wires are polarized, and thus communicate the motion to the molecules in the second vessel, where similar polarizations and disruptions take place, only copper is dissolved in place of zinc, and deposited instead of hydrogen. It will be seen from the facts which I have given to illustrate this theory that electricity is not an entity, is of no substance, is not a current of anything, but is merely molecular polarization, the result in this case of chemical affinity. Current is a term which has so long been used in connection with electricity that it is deemed expedient to retain it, though it conveys the idea of a flow of something.

Electromotive force is the energy set free by satisfied chemical affinity and utilized as electric current by proper arrangements of matter.

Electric Resistance is the opposition which matter offers to polarization by electromotive force.

Electric Current is the result of the overcoming of electric resistance by electromotive force.

These three are dependent upon each other, and are related as is stated in the formulæ of Ohm :

Electromotive force=Current×Resistance.
Resistance=Electromotive force ÷ Current.
Current=Electromotive force ÷ Resistance.

If a bar of soft iron be introduced within a helix of copper wire under the influence of a current of electricity, it immediately becomes magnetic, but loses its magnetism on withdrawal. Reversely, if a magnetic bar be introduced within a helix of copper wire, a current of electricity is immediately started in the wire in one direction, but does not continue, and on withdrawing the bar a momentary current in the opposite direction is started. If between the poles of a horse-shoe magnet we place a piece of iron, the part next the south pole will assume north polarity and the part near the north pole, south polarity. If the piece of iron be wound with a wire or ribbon of copper, and the several turns be insulated from the iron and from each other, and in a direction at right angles to the line of the poles, a current of electricity will start in the wire in one direction, but only for a moment if placed between the poles as before ; and on removal a current in the opposite direction will start. The same effects may be produced by turning the piece of iron so as to reverse its polarity. If now we place the piece of iron on axles parallel with its coil of wire, so that we may revolve it rapidly, and on the axle an attachment called a commutator for the purpose of turning these reverse currents in one direction we may collect the electricity and utilize it. This is a magneto-electric machine of imperfect construction. The results named are produced by induction. Electric currents in conductors induce electric currents in conductors brought near them. Iron has a peculiar property of manifesting magnetism in directions at right angles to currents of electricity, and reversely magnetism induces electric currents in conductors brought near magnets. This is an effect of the electric polarization of matter by force. If we move electric conductors in the neighborhood of magnetic bodies we get currents of electricity. Thus we may apply the force from fuel to move conductors in magnetic fields, and convert the force into electricity.

All the magneto-electric machines are built upon the principles deduced from these facts, and though far from perfect, are being constantly improved. Even now much can be accomplished by them, as I have shown by these notes.

I have found the following formulæ useful in the manufacture of electric machines :

x = force of magnet.
a = length in feet of copper on armature.
b = weight in pounds per foot of copper on armature.

$\frac{a}{b}$ = relative resistance of copper on armature.

c = length in feet of copper on magnet.
d = weight in pounds per foot of copper on magnet.

$\frac{c}{d}$ = relative resistance of copper on magnet.

$c = 4a$.
$d = 4b$.
e = number of revolutions per minute of armature.
ae = electromotive force of armature.

$\frac{aex}{\frac{a}{b}+\frac{c}{d}}$ = current.

NOTES ON THE WASHING OF COAL.

By Max. Evrard, Civil Engineer, Saint-Etienne, France.

(*Continued from Page* 253.)

My experiments on a tolerably large quantity of coal, in the Loire basin, show that the proportion of ash in coals washed either by my system or by that of being drawn along by water, falls to the extent of from ¼ to 5 per cent., according to the nature of the coals, owing to the simple sifting of the sand through a No. 22 canvas, the holes of which are a little less than a millimetre (.03937 in.).

In the following table are two examples of gradation in percentages of ash, applying to coals from the Saint Etienne district, and showing almost extreme qualities :—

Heights of the layers.	Proportion of ash unwashed, 33 per cent. Washed by the classifier. Per cent.	Above the sieve. Per cent.	Below the sieve. Per cent.
Metre.			
0·05	12	—	Dust.
0·10	9	6	59
0·10	14·6	6·4	59
0·10	14	9	64
0·10	21	13·4	67
0·10	23	21·6	67·4
0·10	31	28	63
0·07	39	34	70
0·18	64	Shale.	—
0·90			

Heights of the layers.	Proportion of ash unwashed, 17 per cent. Washed by the classifier. Per cent.	Above the sieve. Per cent.	Below the sieve. Per cent.
Metre.			
0·20	5	—	Dust.
0·20	4	—	"
0·10	4	—	"
0·11	5	—	"
0·20	4·5	4	28
0·20	6·4	6	34
0·10	8	64	37
0·05	8·8	7	55
0·02	18·6	15	70
0·09	81	Shale.	—
1·27			

This method of proceeding, by successive siftings, which can, no doubt, be applied to ores with good results, is not suitable for coal ; very satisfactory results will always be obtained by separating, by means of the classifying apparatus, the dust and the very fine grains, and by again taking up, on appliances similar to small wash-troughs with plungers, the whole layer comprised between these fine particles and the shale. There is no doubt about this, since

with such an apparatus may be obtained, even with raw coal, the freeing from sand and the best separation of the different densities. An appliance for washing a second time becomes then the necessary supplement to the separating apparatus, if it be desired to effect a complete purification, in the same way that the use of a classifying apparatus, in the usual washing floors, will necessarily bring about the suppression of all waste by rendering the dust immediately utilizable, and will increase the effectiveness and the production of the appliances by removing the cause which most interferes with the washing, namely, the agglomeration of the grains.

The appliance for the second washing, to which I give the preference, derives its origin from a system which I described in the *Industrie Minérale* (in 1866), and which is in use at Chazotte and at Epinac. The wash table is circular and revolves slowly, but continuously. The wave motion of the water is due to a central plunger, and produces the same effect as that in the wash-trough with plunger before mentioned.

This "crown," the outside diameter of which is only 4 metres (13 ft.), and the breadth 1 metre (3 ft. 3 in.), is horizontal; it presents a perforated surface of about 10 square metres, which, charged with a layer of coal 10 centimetres (nearly 4 in.) high, and, at the rate of one revolution in three minutes, affords an hourly production of 20 tons; it may be arranged concentrically with the tank of the classifier, and, in this case, the oscillations are produced by the same means as in the latter, by opening to the water passages which remain closed during the separation into classes; but in this case the time occupied in such separation will be increased, and consequently the production will be diminished.

Although this arrangement may appear reasonable, one is led, in order to obtain more prompt oscillations, with no hindrance to the working of the principal apparatus, to render them independent of each other, and to have recourse to a central piston; this consideration it was which led to the execution of a project for the Firminy Company, at its Roche-la-Molière Colliery, for some plant for the complete mechanical treatment of coals, in which the separating appliance, of rectangular form, has a wash-table 6 square metres (64½ square feet) in area. The drawings of this plant are in the hands of MM. RÉVOLLIER, BIÉTRIX & Co. who have undertaken the whole of the mechanical work. Inasmuch as these drawings will be at the service of any one who may be particulary interested in this matter, only a cursory description will here be given of the plant.

The products of the separating apparatus will, as a rule, be divided by horizontal cuts into three portions:—The first, consisting of sufficiently pure dust and fine grains, is led into a hopper which also receives the re-washed coal. The second portion is led into a second hopper which distributes it to the apparatus for the second washing. The third, which consists only of the shale, falls direct into trucks. Several shoots also permit of the separation of the different qualities at each instant.

Above the hopper, where the dust and the re-washed coal are mixed, revolves slowly a perforated and concave sole, covered, in order to filter the water, with a first layer of washed slack. Small scrapers, suitably arranged, stir and mix the coal and work it by degrees from the center to the circumference, where it is received, sufficiently drained, in trucks for being burnt into coke.

The ultimate dust, held in suspension in the water which has been used for washing, is thrown down into a cylindrical tank 5 metres in diameter, and 3 metres high (16 ft. 4 in.×9 ft. 10 in.) at the bottom of which revolve very slowly, the scrapers which impel it (the dust) into a conical tube, whence it is extracted by means of a sluice-valve, and then raised by a chain-pump into the hopper for the re-washed coal. The water, now clarified, is constantly flowing over the tank into a circular channel, whence it returns to the feed reservoir.

According to the estimate of M. MIRC, chief engineer to the Firminy and Roche-la-Molière Company, the cost price of all these operations—screening, washing, re-washing, and crushing, including the unloading of the raw coal, will not exceed 20 centimes (2d.) a ton, not, however, including maintenance or steam, which latter may be generated by the waste gases from the coke ovens.

According to the locality and the special conditions under which the works may happen to lie, certain modifications in the arrangements will be necessary; I have also prepared a series of types or standards, which, while retaining the essential principles which I have just detailed, involve the use of hand labor, instead of the whole or a portion of the mechanism in the case of small outputs.

One of these types, of which I will give a short description, will be found to be a very cheap arrangement, all the work, including even the removal of the washed coal, being performed by hand. The whole apparatus is constructed of masonry, brick, and cement; the "slowly taking" cement is well calculated to resist the action of the steam. The wash-tank of a section 2×1·2 metres (6½ feet×4 feet)—so that the men may be able to work at ease—and holding a charge of at least 2,000 kilogrammes, is only 2 metres (6½ feet) high, which is considered sufficient. The wash-table is fixed. One of the 1·2 metre faces of the tank is closed by one or more superposed vertical doors or sluice-valves; the first being 1 metre (3 ft. 3 in.) high from the orifice to the charge of coal, and the others the height of each quality to be separated. These doors or valves open so as to facilitate the removal of the different layers. The water which covers the charge after each operation is decanted by a vertical channel in the upper valve, and closed by a cock opening downwards as the water throws down the coal dust which it holds in suspension. Two gratings with their bars far apart, like those of the small wash-troughs with plungers (for the purpose of directing the shovel of the workman in the removal of the layers), fixed by hinges to the 2 metre faces, fall back, the one about 20 centimetres (7⅞ in.) above the table for the purpose of limiting the layer of stones, the other below the layer of dust and fine coal.

The apparatus for re-washing is equally simple in construction; it is an ordinary tank, the table of which is 2 metres * long by 1½ to 2 metres wide; it forms part of the separator, one of the 2 metre faces of which it makes use of. This face is open for about a metre high below the table of the separator, in order that the water may act alternately, by opening or closing this passage by means of a sluice, in one or other of the compartments. There is no fear that it will act simultaneously, because the charge of the separator is covered by the water up to the top of the tank when the re-washing takes place (in one or several operations) of the intermediate layer removed in the operation before described. A sluice-valve similar to the first-named, adapted to the face which is common to the two appliances, will, in this case, still further diminish the height of the fall of coal.

Reckoning two operations an hour, this washing apparatus would turn out from 40 to 50 tons daily; and the cost price of the washing, including all expenses, would certainly not exceed 70 centimes (7d.) a ton.

* A metre=3.28 ft.

For the slack, taken just as it comes, the height of the tank would be made from 2 to 3 metres at least, in order to allow the charge to fall into a volume of water, sufficient to insure that the descent of the large pieces shall not be prevented by being encumbered by the small.

The intensity of the ascending current, increased at first, but afterwards diminished for the classification, is favorable to the immediate separation of the large lumps, which take their place with the stones. A few strong shakes, caused by sudden and supplementary admissions of steam, bring the large coal above the pieces of shale (which take their place in the order of their size), at the same time only allowing them to be partially covered by the small pieces of shale. The difference of volume, very sensible in this case, permits of separating, simply with the rake, the large coal from the large pieces of shale which occupy the bottom.

The small pieces of shale mixed with the coal which overlies the large pieces, are removed by screening on an inclined grating. This method succeeds very well, even for the lower layer of those screened to 3 centimetres (1·18 in.); the result is to reduce the proportion of ash from 30 to about 15 per cent., by abstracting all the actual shale of this latter product, which is found to be almost entirely composed of "*barrès*" (striated coal), and of "*crus*" (raw).

In presence of the losses which result from impure coal, and the slight expense attending the operation of washing, it may be asked if ironmasters and large manufacturers would have no interest in erecting at their works an apparatus of this kind? It would, at least, be a sure method of remedying the drawbacks here pointed out, without any damage resulting from the washing; for the shale, as well as its carriage, will have already been paid for.—*Colliery Guardian.*

MODEL OF A MINE AND BREAKER.

The Result of Seven Years Toil on the Part of Two Scranton Mechanics.

ONE of the most ingenious pieces of mechanism we have seen for some time, has just been completed by two Scranton mechanics, W. Y. THOMAS and GEORGE PETTIGREW. It is a model coal mine and breaker in miniature, showing with an accuracy really marvellous, the *modus operandi* of mining coal and putting it through the several processes which it undergoes in preparing it for the market. The entire machine is actuated by steam, setting miners, mules, breaker machinery, cracker boys and cracker bosses to work, and reproducing in a wonderfully realistic manner the busy scenes witnessed at any of our coal mines in full operation. The machine stands nine feet high to the top of the breaker-tower, five feet six inches wide across the shutes, six feet six inches wide across the mine, and fourteen feet long.

THE MINE

is a prettily executed affair, a perfect *fac-simile* of the scene that may be witnessed from the main gangway of any of our mines at work. There are three chambers, showing two little men in each, busy as beavers with their miniature steel picks, hammering away at the slabs of anthracite that lie around them, or breaking their way into the solid breast of coal. They are equipped with hats and little lamps which, when lighted, produce a capital effect. These are set in motion by the mine machinery. In another part of the mine is shown a group of miners at dinner, and while the spectator is watching the scene a mule suddenly emerges from a branch gangway, drawing a loaded car upon which the driver is seated with a lamp in his hat, and a whip in his hand with which he vigorously belabors the animal until they sweep round a curve and emerge from sight. The mode of laying tracks in the mines is also shown, as is that of ventilation in a most perfect manner.

The mine is composed principally of anthracite, ingeniously inlaid with layers of rock, slate, etc., showing the general character of the strata in the mining regions. Above the mine is a good view of a mining settlement, showing a blacksmith and assistant vigorously at work sharpening picks.

THE BREAKER.

The tower of the breaker has two carriage-ways through which the empty and loaded cars are hoisted and lowered rapidly. The cars are self-loading and self-dumping. The coal is run from the top down a steep shute, some ten feet long, and lined with Russia iron. It is sent rushing into the hopper, where it is speedily crushed by the crackers; then it emerges into the screen-room, where there are two pairs of screens, a large and a small one, from which the different sizes of coal are sorted. Here a busy scene is presented. A number of cracker-boys with nimble arms and bowed heads are shown in the act of picking out the slate, while the sour-visaged cracker boss with his heavy "rawhide" passes up and down before them. This scene is very realistic. From this department the coal rushes into the "pockets," which are supplied with latches, showing how the shining stuff can be loaded into a D. L. & W. coal car standing on the track waiting to receive it.

THE MACHINERY

is exceedingly intricate in detail, and admirably constructed. It is actuated by a good-sized boiler, three-horse power, and run at a pressure of sixty pounds of steam, but capable of standing 100. The breaker machinery consists of a double hoisting engine, link motion, three-inch stroke, and moving two small drums, which work to perfection. The breaker engine has a five-inch stroke and a fly-wheel 24 inches in diameter.

The whole taken together is a marvel of mechanism and patient toil, having taken the two young men who own it over seven years to complete it. The men, boys, mules, and other automata move like clock-work, and all act with unerring precision.

There is also connected with the affair an exact model of the first engine ever employed for breaking coal by steam power. It was used at Minersville, by GIDEON BAST, in 1844.

MESSRS. THOMAS & PETTIGREW took a prize medal for their hoisting engines at the State Fair in 1871. They are both energetic and industrious young men, and are employed at the Dickson works. The model mine and breaker was begun nearly seven years ago, and was made, at a great expense of time and money, and many a sleepless night was spent over it. But if we are not mistaken, it will amply repay for all the time and toil it cost.—*Scranton Republican.*

THE CUMBERLAND COAL TRADE.—The various coal agencies in Georgetown are making preparations for the opening of the coal trade. Instructions have been issued to Superintendents of the several divisions of the Chesapeake and Ohio Canal, to have that highway open for traffic by the 10th inst., and it is being put in excellent condition for freighting. The new outlet lock will, it is thought, be in working order in a few weeks; and boatmen are very favorably disposed towards the improvement, as by using it they can be promptly locked into the Potomac. By using the outlet lock boats can now go direct to Alexandria by the river, instead of the aqueduct and canal, as formerly. It is not expected that boating will be fully resumed before the 1st proximo.

NEW PUBLICATIONS.

RESISTANCE OF MATERIALS. DE VOLSON WOOD. JOHN WILEY & SON, New York, 1875. $3.00.

THIS book is mainly composed of a compilation of various experiments that have been made on the subject, with remarks by the author. In this condition it fills a recognized want, both to the student and the practical engineer.

Many of the experiments are now published for the first time in book form, the first publication having been either in periodicals or in reports of societies, and have not, therefore, been generally accessible to the engineering profession.

Few engineers, in the practice of their profession, even if they have the means to purchase, have the leisure, and fewer both the leisure and the ability to sift out from the numerous periodicals, or from the complete reports of the experiments, the comparatively few which lead to definite practical results. This has been done by Prof. WOOD, who has made, at the same time, an intelligent criticism on them.

Apart from the exhibit of the experiments, this criticism has a considerable value. The experiments are not generally criticized by any one except the experimentor, who is often blinded by a certain theory, and is led, unintentionally, to warp the results of all his experiments to suit it.

In some cases the author has, however, appeared to lean a little to the opposite side, particularly in the case of the alleged superiority of drilled over punched holes for riveted joints. These experiments are mainly drawn from Mr. FAIRBAIRN, who, notwithstanding a small excess of strength in the case where the holes were drilled, unmistakably recommends "*punched holes.*"

I may, however, have misunderstood the author's remark that "a better way is to bore the holes" (page 31). In respect, taken from FAIRBAIRN, it may be remarked that, for steam boilers, as the plates become thicker, i. e., from $\frac{3}{4}$ inch upward, modern practice is to make the rivets smaller and to dispose them as in "chain riveting." With $\frac{7}{8}$ plates the rivets may be $1\frac{1}{8}$ inches in diameter and 3 inches between centers, without danger of leakage.

The experiments cited on necessary thickness of web of railroad iron are interesting and surprising. Also in effect of temperature on the strength of iron and steel rails.

The author gives a resumé of some of the most prominent theories of the resistance to flexure. It appears that in this he scarcely does justice to Mr. BARLOW, as he conveys the idea that his theory was built upon analysis, whereas it was really on hypothesis used to explain certain experimental results.

A portion of the book contains the algebraic analysis of the theory of resistance with some new formulæ. One of the most interesting items in the book is a new formula proposed by Prof. Norton, for deflexion of beams, which, at the same time, satisfies both the theoretical and experimental conditions.

The author has resisted entirely the temptation to sift into the text any advertisements of popular institutions or processes, a custom now unfortunately too common in the literature of American science.

In conclusion, this may be considered one of the most valuable books, of its class, both to the student and engineer. T. S.

SELECTED LIST OF PATENTS.

FOR THE WEEK ENDING MARCH 10, 1876.

Relating to Mining, Metallurgy, Gas Making, Engineering, etc. Reported for the "Engineering and Mining Journal" by Louis Bagger & Co., Solicitors of Patents, Washington, D. C.

173,730. Processes for Manufacturing Coal Gas, M. W. Kidder, Boston, Mass.—Air, products of combustion from the furnace, and steam are introduced successively into the retort, where coal is being distilled. The mingled gases, on leaving the retort, pass through a coil of pipe above the retort, into which is admitted a liquid hydrocarbon. The mingled gases then pass through a coil of pipe under the retort, where the process of making a fixed gas is completed.

173,726. Ratchet Drills, A. Beck, Phillipsburg, Pa.—Two gears—one fixed and the other loose—on the drill shaft, are connected with each other by idlers, and are each provided with ratchets, the teeth of which incline in opposite directions. The ends of the pawl-carrying-lever are sleeved upon the drill shaft. The pawls each alternately engage with, and slip over, the ratchets, and cause the drill to be turned continuously in the same direction by opposite motions of the operating lever.

173,794. Earth Augers, W. W. Jilz, St. Louis, Mo.—An earth auger of two rodhinged together at the top, and provided below with spiral-bottom cutters, having blades inclined crosswise to each other, and a hollow center. The hinge is provided with side plates and an eccentric lever to clamp it; it is operated by a cord, which passes through the auger shaft.

173,835. Air Compressors, G. Westinghouse Jr., Pittsburgh, Pa.—A series of independently-operating pumps, alternating with a series of independent receivers and a system of interposed check-valves, whereby the rapidity of the motion of all the pumps in the series will be regulated in part by the pressure in the last of the series of receivers.

NOTES.

MUCILAGE FOR MINERALS, ETC.—The following recipe for mucilage to mend fossils and minerals, has been found valuable in practice:

Starch	2 dr.	Gum Arabic	2 dr.
White Sugar	1 oz.	Water	q. s.

Dissolve the gum, add the sugar and boil until the starch is cooked. Prof. WHITFIELD of Albany, N. Y., who gives the recipe, is in the habit of drying it in sheets, on paper, and re-dissolving when wanted. It is certainly a very adhesive mucilage, and, owing to the sugar, never becomes brittle; so that it never scales off, as most glues do, from stones or other hard substances. In a geological cabinet it is simply invaluable.

COAL MINERS' STRIKE.—CLEVELAND, March 12.—On March 1, in accordance with the notice given last February, the coal operators of Tuscarawas Valley reduced the price for mining coal ten cents per ton. Nearly all the miners refused to work at the reduction, and many of them are now idle. A similar reduction was made last week in other coal districts of the State, and resulted in a strike of the miners. An effort to compromise matters accomplished nothing, and the prospects are that the miners will be idle a long time. No violence has been reported.

PARSON'S MANGANESE BRONZE.—A new variety of bronze, containing manganese, is just being introduced by PARSON'S White Brass Co. It is stated to be very valuable for all kinds of small work wherein gun metal is now used, and it is capable of being forged like iron. Specimens have been tested at the Royal Arsenal, Woolwich, by Colonel YOUNGHUSBAND, with the following results:

	Tons per square inch. Yielding.	Breaking.	Ratio of Elastic to ultimate per cent.	Elongation per cent.
No. 1	14·0	24·3	57·6	8·25
1a	12·6	29·0	43·4	31·80
2	14·0	22·1	63·3	5·50
2a	13·2	28·8	45·8	35·35
3	16·8	23·6	71·1	3·80
3a	12·0	30·3	39·6	20·75

Nos. 1, 2 and 3 were cast in iron moulds, and Nos. 1a, 2a, and 3a were forged from the same castings. No. 3 had slight flaws in it. The hardness increases as the numbers rise, No. 3 being about as hard as our bronze coinage. The sectional area of the test pieces was ·533 square inch and their length 2 inches.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending March 11.

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co	†....	240,866	52,291	502,314
D. L. and W. RR. Co.	8,426	205,592	45,073	395,208
Penn. Coal Co	....	179,259	17,124	209,052
L. V. RR. Co.	4,047	120,282	16,377	211,476
P. and N. Y. RR. Co.	....	3,352	753	2,716
C. RR. of N. J.	791	115,674	9,403	39,350
	13,264	865,625	141,021	1,360,119
Lehigh Region.				
L. V. RR. Co.	13,058	233,502	5,232	94,228
C. RR. of N. J.	3,198	142,153	730	4,302
D. H. and W. B. RR.	913	5,305	704	4,519
	17,169	380,960	6,666	103,049
Schuylkill Region.				
P. and R. R. RR. Co.	16,062	287,948	24,753	166,103
hamokin & Lykens Val.	6,613	34,638	17,664	102,952
	22,675	322,586	42,417	269,055
Sullivan Region.				
Sul. and Erie RR. Co.	1,414	10,879	272	2,470
Total	54,522	1,580,050	190,376	1,734,690
Increase	..	..	..	..
Decrease	..	..	..	..

* Year beginning January 1st.

† This reports has not been received for five weeks.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

The receipts at Port Richmond for the week were 250 tons, shipments 14,500 tons, and balance on hand 93,750 tons.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads amounts to 2,352 tons, as compared with the corresponding period in 1875.

Perth Amboy business:

	Tons.
Received for the week	1,773
Shipped for the week	11,123
On hand March 11	75,321

We have had a little stir here in shipments, and it appears there is beginning to be some inquiry for coal. Freights to Boston, $1.05; New Haven, 70c.; New York, 40c. E. R. BUCKLEY.

Receipts of Coal at Boston, for week ending March 3, and years from September 1st, 1874 and 1875.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	—	54,364	45,700
Philadelphia	460	342,518	249,532
Baltimore	—	73,279	70,424
Other places	2,489	150,250	100,097
Great Britain	—	2,510	1,733
Nova Scotia	—	12,851	14,105

The Exports of Coal from Baltimore for the week were 000 tons, and since Jan. 1st, 6,013 tons, as against 7,555 tons for the corresponding period of 1875.

Belvidere Delaware RR, report.

	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	—	1,914	..
" " " South Amboy	296	84,213	16,626
Shipments at Coal Port (Trenton)	—	..	..
" South Amboy	12,322	63,438	61,680

The Production of Bituminous Coal for the week ending March 11, was as follows:

Tons of 2,000 lb., except where otherwise designated.

	Week, Tons.	Year, Tons.
Cumberland Region, Md.		
Tons of 2,240 lb.	23,105	188,164
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb.	6,925	69,084
Broad Top Region, Pa.		
Huntingdon and Broad Top RR.	2,905	28,778
*East Broad Top	1,447	11 985
Clearfield Region, Pa.		
*Snow Shoe	1,762	9,075
*Tyrone and Clearfield	20,470	148,980
Allegheny Region, Pa.		
*Pennsylvania RR.	3,895	31,089
Pittsburgh Region, Pa.		
*West Penn. RR	5,382	35,639
*Southwest Penn. RR	1,433	11,182
*Penn. & Westmoreland gas coal, Pa. RR.	13,692	110,722
*Pennsylvania RR.	8,058	57,984
Kanawha Region, W. Va.		

* To Feb. 29.

The Production of Coke for the week ending Feb. 29.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	..
Alleghany Region	..	..
West Penn. RR.	1,147	7,627
Southwest Penn. RR.	9,508	67,837
Penn. & Westmoreland Region, Penn. RR.	754	5,976
Pittsburgh, Penn. RR.	4,813	37,751
Total	16,222	119,131

COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 17, 1876.

Anthracite.

In past years, the combination adopted a programme early in the season, and made a grand display of strength and firmness, which, however, after contracts had been made with a large portion of the buyers, was invariably succeeded by weakness; showing those who had purchased early, that they had made a mistake by doing so. It is too early yet to predict how closely the programme of this year will be observed, but, from present indications, much dissatisfaction seems likely to arise from the programme as adopted. It is unsatisfactory to many buyers, and it is not altogether satisfactory to some of its framers. One thing likely to destroy buyers' confidence in the combination is its lack of stability. The programme gave certain prices for actual consumers of coal, and others for contractors. This was followed under the consideration of "details" by the establishment of minimum quantities as necessary to entitle a contract application to consideration. Following this came another resolution rescinding the limit and leaving the companies to contract for such quantities as they see fit. The Boston merchants appear to be somewhat confused as to the programme and its details. A correspondent writing from that city says they have called in the "wise men of the East" to explain it, but to no avail.

There is but very little business doing at present—so little, that it is now understood a resumption of mining will not take place until April 3d; and should there not be an improvement in business before that time, it is doubtful if it will take place even then. The consumption of domestic sizes of coal is very light, and will constantly decrease, while the manufacturing interests are very much depressed, with an inclination to suspend operations in many branches. This season opens with no very brilliant prospects for the coal trade. To add to the demoralization already existing in the anthracite

trade comes the announcement of reductions in freight on roads carrying bituminous coal, with corresponding reductions in the prices of these coals, and indications of further economies in the cost of placing them at tide-water, which will eventually lead to even lower prices than are now quoted.

THE PHILADELPHIA & READING RR. Co's CIRCULARS.

All of the following bear date of Philadelphia, March, 13, 1876.

Circular No. 4, says:

"On all coal shipped from Port Richmond, or via the Schuylkill Canal, from April 1st, to December 31st, 1876, on account of accepted applications from contractors for the purchase of a stated quantity of coal, at the current contractors' circular prices established for each month by the Board of Control of the anthracite coal companies, a drawback on the freight and tolls of ten cents per ton will be paid, provided said applications have been filed in the office of the company on or before the 31st of March (in accordance with the rules relative to drawbacks on contracts), and provided that no contract shall be filed between a shipper and his own agent, and that upon the presentation of any such applications for filing as aforesaid, the company shall have the right to determine whether the applicant named therein is a contractor, within the meaning of the term as herein used."

Circular No. 5 says:

"If any written contracts are made with consumers for lump, steamboat, broken, Nos. 1 and 2 chestnut, or pea coal, at not less than the following fixed monthly prices f. o. b. at Port Richmond for each month, viz.:

	Lump	Steam-er.	Broken.	Chestnut No 1.	Chestnut No. 2.	Pea.
March and April	$3 85	$3.95	$4.05	$3.95	$3.60	No Limit as to Price.
May	3 90	4.00	4.10	4.00	3.65	
June	3 95	4 05	4.15	4.05	3.70	
July	4 00	4.10	4.20	4.10	3 75	
August	4 05	4.15	4.25	4.15	3.80	
Sept.	4 10	4.20	4.30	4.20	3.85	
October	4 14	4.25	4.35	4.25	3.90	
November	4 20	4.30	4.40	4 30	3.95	
December	4 25	4.35	4.45	4.35	4.00	

"To be shipped from Port Richmond, consigned to any points whatever, and if such contracts are filed in the office of the company (in accordance with the rules relative to drawbacks on contracts) on or before the thirty-first day of March, there will be paid upon all coal shipped from Port Richmond to fill such contracts prior to the first of January next (provided such coal is shipped in accordance with the rules relative to drawbacks on contracts aforesaid), such a sum as drawback as will reduce the freight and tolls from Schuylkill Haven to thirty-seven and a half per cent. of the price at which the coal is sold on board at Port Richmond; provided that the net rate of freight and tolls, after payment of drawbacks, shall not be less than $1.40 per ton from Schuylkill Haven upon pea coal. If any similar contracts are made for the same kinds of coal, to be shipped from Schuylkill Haven by canal to points in or beyond the Bay of New York, at prices corresponding with those in the above table, and the contracts are filed at the time and in the manner above provided, there will be paid upon all coal shipped by canal from Schuylkill Haven to fill such contracts prior to the first of January next, such a sum as drawback as will make the net amount to be received for the coal at Schuylkill Haven (after payment of freight and tolls) equal the amount that would have been received for the same at Schuylkill Haven had the coal to fill the contract been shipped from Port Richmond; provided that upon the presentation of any such contract for filing as aforesaid, either by railroad or canal, the company shall have the right to determine whether the purchaser named for such contract is a consumer, within the meaning of the term as herein used."

"CIRCULAR."

"The following regulations relative to the payment of drawbacks on coal sold under contract, and shipped from Port Richmond or via Schuylkill Canal, will be observed:

"1. The shipper must, in all cases, furnish the undersigned with the original contract or agreement upon which the coal is to be shipped, which will be returned (properly indorsed and numbered) if required, and a copy thereof preserved in this office. These contracts must either be signed by the parties thereto, in person, or, if otherwise signed, the authority for such signature must accompany the contract.

"2. The shipper must sign a certificate, to be indorsed in writing, upon the contract, that he has no interest whatever in the coal so sold beyond the price so named in the contract, that the coal is not to be sold by the contractor for or on his account, and that no commission or other pecuniary consideration whatever is to be received by him, or on his account, from the contractor, vendee, consignee, other than the said contract price.

"3. The master of the vessel must sign a bill of lading for each cargo shipped from Port Richmond, in the book kept by the General Agent of this company at that place.

"4. The shipper will send a bill of lading for each cargo to the consignee, who will indorse thereon his receipt of the coal, and return it to the shipper, who must also indorse thereon the fact of its being a shipment under the contract to which it belongs, and that he has no interest whatever in the coal so delivered, other than the original contract price thereof.

"5. The shipper will then present his bill for drawbacks, accompanied by the bills of lading indorsed as above, to the Comptroller of the company, on each Tuesday, for coal shipped during the previous week.

"6. The bills will be paid to the shipper, if found correct, on the Tuesday following presentation.

"If any cargo fails to reach its destination from any cause whatever, and is reconsigned, such reconsignment will be considered a new shipment, and the drawbacks will be readjusted under rates current at time of reconsignment.

"No drawback bills will be passed by the Comptroller unless the above regulations are fully complied with."

Circular No. 3, says:

"The charge of fifteen cents per ton for shipping anthracite coal at Port Richmond, will continue in force until further notice."

SCHUYLKILL CANAL TOLLS.

The charge for the use of cars and barges, and for toll on anthracite coal carried on the Schuylkill Canal, on and after March 20th, 1876, will be as follows, and so continue until further notice:

STATIONS.	From Schuylkill Haven.	From Port Clinton.
To Orwigsburg Landing	50	44
Hamburg	50	44
Mohrsville	50	44
Althouse's	50	44
Reading	50	44
Birdsboro'	55	49
Monocacy	55	49
Port Union	65	59
Pottstown Landing	65	59
Lawrenceville	68	62
Royer's Ford	68	62
Phœnixville	71	65
Port Providence	75	69
Pawling's Dam	75	69
Valley Forge	75	69
Port Kennedy	75	69
Norristown	77	71
Bridgeport	77	71
Plymouth Dam	82	76
Conshohocken	82	75
Spring Mill	82	76
Manayunk	92	86
Philadelphia	100	94

The rates of toll on lump and steamboat coal (except that for New York and vicinity) will be thirty per cent. less than the above rates.

The charge will be per ton of 2,240 lb. No charge less than forty cents per ton will be made for any distance.

PHILADELPHIA AND READING RAILROAD FREIGHTS.

The rates of freight and tolls on anthracite coal transported by this company will be as follows, in company's cars, per ton of 2,240 lb., from March 20th, 1876, until further notice:—

STATIONS.	FROM Pine Grove.	Tamaqua.	Schuyl. Haven.
MAIN LINE.			
To Ringgold		$0 50	
" Landingville			$0 50
" Auburn			54
" Port Clinton	$0 91	86	71
" Hamburg	98	93	78
" Shoemakersville	1 05	1 00	85
" Mohrsville	1 07	1 02	87
" Leesport	1 10	1 05	90
" Tuckerton	1 14	1 09	94
" Reading	1 20	1 15	1 00
" Exeter	1 28	1 23	1 08
" Birdsboro'	1 32	1 27	1 12
" Monocacy	1 34	1 29	1 14
" Douglassville	1 38	1 33	1 18
" Pottstown	1 44	1 39	1 24
" Limerick	1 52	1 47	1 32
" Aramingo	1 53	1 48	1 33
" Royer's Ford	1 54	1 49	1 34
" Phœnixville	1 60	1 55	1 40
" Perkiomen Junction	1 63	1 58	1 43
" Valley Forge	1 65	1 60	1 45
" Port Kennedy	1 68	1 63	1 48
" Port Kennedy Railroad	1 74	1 69	1 54
" Bridgeport	1 74	1 69	1 54
" Rambo's	1 75	1 70	1 55
" Swede Furnace	1 76	1 71	1 56
" West Conshohocken	1 78	1 73	1 58
" Egbert's	1 82	1 77	1 62
" Mill Creek	1 83	1 78	1 63
" West Manayunk, " West Falls, " Nicetown, " Belmont	1 95	1 90	1 75
" Philadelphia, " Richmond	2 05	2 00	1 85
" Richmond for shipment	1 95	1 90	1 75

1. The rates of freight and tolls on lump and steamboat coal (except that sent to Richmond for shipment) will be twenty per cent. less than the above rates.

2. An additional charge of twenty-five cents per ton will be made on chestnut and pea coal to whatever point consigned. If the shipper signs a release of all demands arising from a deficiency of weight at the place of destination, and agrees to indemnify the company from all claims by reason thereof, such additional charge will not be made. Releases, properly prepared, will be furnished, and can be signed at the coal offices of the company, at St. Clair, Palo Alto, Schuylkill Haven, Mount Carbon, Pine Grove, and Tamaqua.

LATERAL RAILROADS IN COAL REGION.

1. For shipment via Main Road or Schuylkill Canal, one and one-half cents per ton per mile, and two cents per ton additional, to Schuylkill Haven, Pine Grove, Tamaqua, or Port Clinton for canal, as the case may be.

2. To points on the Catawissa & Williamsport Branch, one and one-half cents per ton per mile, and two cents per ton additional to Tamanend.

3. For consumption at local points in coal region, including Shamokin, Herndon Schuylkill Haven, Pine Grove, and Tamaqua, three cents per ton per mile, and two cents per ton additional; and a charge for *car service*, of fifteen cents per ton to individuals, and five cents per ton to manufacturers, when in Philadelphia & Reading Railroad cars.

4. Sent westward via Northern Central Railway (in N. C. R. W. Co.'s cars), four and two-tenths cents per ton per mile, to Locust Gap, Shamokin, or Herndon.

5. No charge will be made less than twenty-five cents per ton, including freight, tolls, and car service.

6. One mile extra will be added for coal passing through the East Mahanoy Tunnel.

7. Fractions of distances and rates will always be stated in *tenths*.

8. No charge will be made for weighing or making returns of coal shipped, and the latter will be furnished free of charge, upon application to the Weighmaster; if these returns are to be sent by mail, envelopes, properly stamped and addressed, must be furnished to the Weighmasters.

9. All coal will be charged the rates (both lateral and Main Line) current on the day it is weighed; it will also be way-billed the same day.

This circular contains in addition to rates of freight on "Main Line" the rates for the several branches of the road. Our space is too limited to permit of publishing this circular in full, but parties desiring the same can procure it at the office of the company, 227 South Fourth street, Philadelphia.

The following was dated March 16th:

The charge for freight on anthracite coal carried on the Schuylkill Canal, in boats of the Philadelphia and Reading Railroad Company, on and after March 20, 1876, will be as follows, and so continue until further notice:

STATIONS.	From Schuylkill Haven.	From Port Clinton.
To Orwigsburg Landing	30	25
Hamburg	33	28
Mohrsville	36	31
Althouse's	36	31
Reading	41	36
Birdsboro'	46	41
Monocacy	51	45
Port Union	54	49
Pottstown	56	51
Lawrenceville	64	59
Royer's Ford	64	59
Phœnixville	64	59
Port Providence	66	61
Pawling's Dam	66	61
Valley Forge	66	61
Port Kennedy	66	61
Norristown	68	63
Bridgeport	68	63
Plymouth Dam	68	63
Conshohocken	68	63
Spring Mill	68	63
Manayunk	70	65
Philadelphia	70	65
Bridesburg, add $10 per boat	70	65
Beverly, N. J.	85	80
Florence, N. J.	85	80
Bordentown, N. J.	87	82
Trenton, N. J.	105	100
New York	155	150
Cooper's Creek, N. J.	75	70
Up Darby Creek	—	—
To S. MORTON & SON	85	80
Up Ridley Creek to near its mouth	85	80
Chester—to all points below railroad.	85	80
Chester Creek—Hospital	90	85
" " Crozier's	95	90
Wilmington, Del.	85	80
Brandywine	90	85
Newport, Del.	95	90
New Castle, Del.	90	85
Delaware City	115	110
Salem, N. J.	120	115
Bridgeton, N. J.	165	160
Odessa	—	—
Port Deposit, Md.	—	—
Baltimore	—	—

The above rates are exclusive of the cost of unloading, as per circular.

Bituminous.

The Governor of Maryland has signed a bill reducing the rates of freight on the Cumberland and Pennsylvania RR. This is one move towards a much desired cheap manufacturing coal; but the Cumberland companies are well aware that other economies are still necessary, and we now look for an effort to reduce the high wages paid at the collieries to miners and others. An effort was made, early in the year, to accomplish this end, but as the Consolidation Coal Company would not join in the movement it was temporarily abandoned. At that time this company felt secure in its ability to earn dividends on its large capital from its exorbitant rates of freight—it will now be necessary to consider more seriously the question of economy at the mines if it would maintain its dividends. We may, therefore, look for a reduction in miners wages. Until this question is decided there

will not be much inclination to do business. We are reported a sale of 20,000 tons of Cumberland coal to a Long Island RR., at $4.94 delivered.

The Pennsylvania RR. has announced a reduction of its freights which on coal, applies to shipments from South Amboy, and eastern shipments from Greenwich, Philadelphia. We are now quoted some of the Clearfield and Broad Top coals at $4.60@$4.65 at South Amboy. There are no very important contracts being made in these coals, though there is a fair amount of business doing and a large production for the year is looked forward to.

Gas Coals.—The Baltimore and Ohio Railroad having been outwitted by the Pennsylvania Railroad in an attempt to secure the gas-coal trade of this city and vicinity, has offered an inducement for such business as remains, which has resulted in sales, during the week, of about 15,000 tons. We previously reported sales at $4.25, f.o.b., Greenwich, Philadelphia, of some Penn Gas Coal Company's coal for eastern delivery. We have since been informed that this price only applies to coal to be shipped to Boston, and that a special rate of freight has been made by the Pennsylvania Railroad for these shipments. The miners in the gas coal district of Southwestern Pennsylvania have instituted a strike for an advance of wages, and many collieries are now idle. The great reduction in the price of gas coals does not, certainly, give much room for an advance of wages.

A correspondent, writing to us from Baltimore on the subject of the late defeat of the Baltimore and Ohio Railroad in its battle with the Pennsylvania Railroad for the gas-coal trade of this city, says: "The plans had all been deeply laid and the lines drawn closely; all eyes and ears were open to learn the result, when Col. T. A. SCOTT, by a little of his characteristic strategy, drew the B. & O. officials to Philadelphia under pretense of compromising the fight, and kept them there until his agents had secured the bulk of the business, after which, no agreement having been entered into, the B. & O. officials went to New York, to discover that they were too late. They have found that one cause of their defeat is that they are too much divided, and now propose a combination among the different mining companies. From the lesson they have learned under SCOTT's teaching, your city may expect, for some time to come, cheap gas coal. President KING will have to keep his eye on the Pennsylvania Company, or he will have a large trunk with a great many fruitless branches. SCOTT knows too well the advantages of the coal trade to let it slip his grasp easily."

Freights.

Coastwise freights are very unsettled, and to most points quite nominal From this city to Boston 90c. to $1 is nominally quoted, although we learn of lower quotations. From Georgetown to Boston, charters have been made at as low a figure as $1.45. There is but very little demand for tonnage, and as many vessels are going east for ice, in preference to taking ballast—in the absence of other freight—very low rates are taken for coal. This, however, is not likely to last, as the rates now being accepted are unremunerative. When shipments resume an advance will, doubtless, take place.

Coal Trade of Philadelphia.

PHILADELPHIA, March 16, 1876.

There has been another meeting at the Coal Exchange this week, and the prices to the city and line have been fixed as follows, for Schuylkill coal at Schuylkill Haven:

Lump and steamboat, $2.60, 10 cents less to furnaces and rolling mills; broken, $2.85; egg, $2.95; stove, $3.10; No. 1 chestnut, $2.40; No. 2 chestnut, $2.25; pea, $2 20.

The Lehigh Exchange has fixed the following at Mauch Chunk:

Lump, $3, $2.75 to furnaces; broken, $3.35; egg, $3.35; stove, $3.60; chestnut, $3.10; pea, $1.50.

The time for starting was again opened, and it is now undecided whether the start will be on the 20th, or 27th inst., or on the 3d of April. Sundry negotiations have been adopted for contracts to the city, and on the line. If I undertook to send you the bundle of circulars which have appeared, and to explain them, it would require the whole issue of your paper, and your readers would not be much wiser than they are, for this business has become so complicated, and so regulated to death, that but few feel disposed to undertake devoting the amount of time and study necessary to understand it. That it is in an awful confusion is only stating the unanimous expression of all concerned.

The tolls on the Reading are also published. Port Carbon as a shipping point is abolished, and rates are made from Schuylkill Haven, Tamaqua, and Pine Grove. The rates from Schuylkill Haven are $1.75, and were $1.67 last year until July. The change amounts to a redution of 17 cents on the highest tolls of last year, and an advance of 8 cents on the Spring and early Summer rates. After the promises of lower rates, this has been a sad disappointment to the operators.

The Lehigh tolls to the city are $1.75 from Mauch Chunk, from Schuylkill Haven to 9th street (the main point of delivery) $1.95, or 20 cents more. As it is agreed that Schuylkill stove, for instance, shall be 30 cents less at 9th street than Lehigh at Bark's. The Schuylkill operator has to stand the 20 cents extra tolls, besides the 30 cents, making 50 cents less.

Contracts are coming in slowly, and orders for shipments continue very scarce. Freights remain as low as last quoted by us.

Wholesale Prices of Anthracite Coal for March, f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	4 60	4 70	4 80	4 90	5 50	4 70
Pittston at Newburg	4 45	4 55	4 65	4 75	5 35	4 55
Wilkesbarre at Port Johnston	4 60	4 70	4 80	4 90	5 50	4 70
Plymouth, R. A.	....	....	4 80	5 00	5 60	4 80
Susque. Coal Co. at Amboy W.A.	4 60	4 70	4 80	5 00	5 50	4 80
Kingston at Hoboken	4 60	4 70	4 80	4 90	5 50	4 70
Lehigh Coals.						
Old Company at Port Johnston	5 10	....	4 90	4 90	5 50	4 80
Old Company's Room Run "	5 10	....	4 90	4 90	5 50	4 80
§Sugar Loaf, Hobok. & Amb."	5 10	....	4 90	4 90	5 50	4 80
Lehigh Coal Exchange "	5 10	....	4 90	4 90	5 50	4 80
Honey Brook Lehigh	5 10	....	4 90	4 90	5 50	4 80
Beaver Meadow at South Amboy	5 10	....	4 90	4 90	5 50	4 80
Schuylkill Coals at North 9th st., Brooklyn, E. D.†						
Schuylkill white ash	4 60	4 70	4 80	4 90	5 50	4 70
Schuylkill red ash	...	....	....	5 00	5 60	4 70
Shamokin white and red ash	....	....	....	5 00	5 60	4 70
Lorberry	....	....	5 70	5 70	5 70	4 75
Lykens Valley	....	....	6 10	6 10	6 10	5 20

* Contractor's prices are 20c. per ton less.

† The prices of Schuylkil coals for shipment from Philadelphia are 35c. per ton less than at Brooklyn.

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

Per ton.

Freight from Hoboken and Weehawken to New York 35@40c.
" " Elizabethport & Port Johnston to N. York. 40c.
" " South Amboy to New York ..... 40c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

Prices of Anthracite Coal, f.o.b. at New York Shipping Ports, to actual consumers with whom season contracts may be made.

	Lump.	Steam.	Broken.	Chestnut
March	4 20	4 30	4 40	4 30
April	4 20	4 30	4 40	4 30
May	4 25	4 35	4 45	4 35
June	4 30	4 40	4 50	4 40
July	4 35	4 45	4 55	4 45
August	4 40	4 50	4 60	4 50
September	4 45	4 55	4 65	4 55
October	4 50	4 60	4 70	4 60
November	4 55	4 65	4 75	4 65
December	4 60	4 70	4 80	4 70

Prices at Port Richmond, Philadelphia, will be 35c. per ton, less than the above.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$5 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
" South Amboy	8 50	..
" Orrel	6 00	6 50
Youghiogheny, Waverly Co., at Balt	4 25	5 75
Despard, West Va.,	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	6 00
Fairmount, West Va., " "	4 50	6 00
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va., at Richmond	8 75	10 50
" Splint, " "	4 50	6 00
Peytona Cannel, " "	8 75	..
Straitaville " at Sandusky, O.	nominal.	

Manufacturing and Steam Coals.

Cumberland, at Georgetown and Alexandria, Va.	4 00@4 25	5 25@5 50
Cumberland, at Baltimore	4 00@....	5 75@6 00
Kittanning f.o.b. Canton, Baltimore	4 25@4 35	

Broad Top, at the mine, per 2,000 lb., 1 10. f. o. b. Greenwich, Philadelphia, per 2240 lb, 3 90, 4 00. 4 25 and 4 50, according to destination; at Amboy, 5 00; New York, 5 45.

Clearfield and Allegheny, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, per 2000 lb., 90; at Greenwich, Phil., per 2240 lb., 3 90, 4 00. 4 25, and 4 50, according to destination; f. o. b. South Amboy, N. J., 5 00; New York, 5 45.

Foreign Gas Coals.

	Sterling.	Am. cur'cy,
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00@20 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S	2 00	5 00
Caledonia, at Port Caledonia	1 60	4 75
Glace Bay, at Glace Bay	1 60	4 75
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$5 50	$5 80	$5 10
Lackawanna coal, delivered	6 25	6 50	6 00
Wilkes-Barre, "	6 25	6 75	5 75
Lehigh & Locust Mountain, del'd..	7 00	7 25	6 50
Schuylkill Red Ash, del'd	7 50	8 00	

Our retail quotations of Pittston Coal are based on the actual selling rates of the company, nominal quotations of grate and stove are 20c., and of nut 30c. per ton above these rates. The Cost of delivery ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$23 00
Liverpool House Cannel " " "	†22 00
American " " " "	15 00
Kanawha splint, " " "	15 00
American Orrel " " "	13@14
Red Bank Cannel " " "	14 00
Cumberland " " "	9 00

† This quotation is furnished to us by Messrs. WARD, TALBOT & OLYPHANT.

Baltimore, Md. March 14, 1876.

Reported by our Special Correspondent.

No change.

Boston. March 11, 1876.

Coal has had a local anxiety in the strikes of the shovelers against the reduction of 5c. per ton, and cargoes to arrive have been ordered in elsewhere, and no coals have been docked since Wednesday, unless positively essential to the needs of some local or near by steam user. The rate paid the shovelers was 20c. a ton, and Tuesday, when BANGS & HORTON ordered their pockets at the Mystic Wharf, Charlestown, and Phillips Wharf, Salem, to pay only 15c., the shovelers' unions, 800 strong in Boston and 350 in Salem, held special meetings and ordered a strike in both places. The final result will be that Boston shovelers will yet be paid 12c. a ton the same as the Providence rate. This seems to be no more than justice, considering New Bedford pays 12c., Fall River 10c., and Newport 8c. This difficulty has had its effect upon the retail yards in checking their demoralized tendencies, and nothing is now quoted less than $7.50 delivered for house coals, though the majority ask $8. The warm weather again restricts this distribution.

BITUMINOUS coals are very quiet. The prices have not yet been made, although the majority of the dealers in Boston think $3 75 the very lowest price from shipping points. There is, however, a great deal of uncertainty regarding this measure. The Annapolis Legislature have indicated by preliminary votes a strong probability of hitching a sort of Potter Law on the Consolidation Company's road, which if finally accomplished will make the soft coals from the Cumberland and Pennsylvania railway districts cheap enough. Steam users are more likely to await the fixing of all these differences before making contracts in any direction for the season. There is very little doing, no cargoes of any note offering upon the open market, while receipts are very light. —*Commercial Bulletin.*

Chicago, Ill. March 14, 1876.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants. Retail prices per ton of 2000 lb. delivered to buyer.

We have no changes in prices of coal to report. Weather mild and sales therefore light. Retail prices said to be well sustained—but some dealers are anxious to realize, without *special* regard to the prices established by the Coal Exchange.

Cincinnati, O. March 13, 1876.

Reported by our Special Correspondents.

But slight change in price of coal. We quote to-day:

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	8 c.	——
Pomeroy coal "	5 c.	——
Kanawha " "	7½c.	——
Cannel coal, according to quality "	11@16 c.	——

The following are the retail prices delivered

Pittsburgh coal, per load of 25 bus	$3 00
Youghiogheny—c.	3 00
Pomeroy 11c.	2 50
Cannel —c.	5 50
Kanawha Semi-Cannel —c.	3 00
Anthracite, per ton	10 00@11 00
Coke, at yard 7c.	——
Coke, hard and soft, delivered 9c.	——

Detroit, Mich. March 13, 1876.

Specially reported by Messrs. ROBINSON & KEYS, Dealers in all kinds of coal.

Per ton of 2000 lb.			
Lehigh Lump, per ton.	$10 50	Blossburg	8 50
Lehigh " prep.sizes.	10 00	Briar Hill	7 50
Wilkes-Barre, Grate and Egg	9 00	Willow Bank	7 00
Wilkes-Barre, Stove and Nut	9 50	Erie	50
		Massillon	7 00

Erie, Pa. March 13, 1876.

Wholesale, per ton of 2000 lb. Bituminous f. o. b.

Briar Hill lump	$3 75	Beaver lump	$3 50
Midway	3 25	Cat Fish	3 00

Louisville, Ky. March 14, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Our market is now, as during most of the Winter, very quiet.

Please report our prices as follows:

WHOLESALE.

	per bushel		per bushel
Pittsburgh	12c.	Pine Hill	—
Raymond City	9c.	Kentucky	8c.

RETAIL.

	per bushel		per bushel
Pittsburgh	12c.	Peytona Cannel	20@22c.
Raymond City	11c.	Buckeye "	20c.
Pine Hill	13c.	City-made Coke	10c.
Kentucky	10c.	Anth., per ton, $10 00 to 10 50	
Screened Pittsburgh per load			$3 00
Screened Raymond City			2 75
Pine Hill (Kentucky)			2 75
Cannel			$5 to 5 50

Milwaukee, Wis. March 13, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Our market in coal remains unchanged with but little demand. Prices remain the same.

Retail price per ton of 2000 lb.

Lehigh Lump	$10 00	Briar Hill, select	$8 00
Lehigh Prepared	11 00	Blossburgh	8 00
Lackawanna (all sizes)	10 00	Cannel	8 00
Pittston	10 00	Pittsburgh	7 00
Scranton	10 00	Steam coal	5 00

San Francisco, Cal.

From the *Commercial Herald*, March 2, 1876.

Imports from Jan. 1st to Feb. 16th :

	tons.		tons.
Anthracite	3,693	English	5,502
Australian	6,416	Vancouver Island	8,487
Coos Bay	7,108	Rocky Mountain	64
Cumberland	2,044	Seattle	10,744
Mt. Diablo	8,653	Bellingham Bay	3,175

The arrivals during the period under review embrace the following: *Aurora*, 1,300 tons Seattle: *West Riding*, 1,462 tons Australian; *Southern Chief*, from New York, 440 tons; *Marmion*, from New South Wales, 1,155 tons. These, with continued receipts from our own Mt. Diablo mines, from Coos Bay, Bellingham Bay and British Columbia, conspire to keep prices steady. In the absence of reported sales, we quote Australian $10.25@10.50 ex ship. Supplies of Cumberland are well controlled, and in casks held at $22; bulk, $18. Lehigh is plentiful and prices nominal. We quote Bellingham Bay at $8.50; Coos Bay $10; California Mt. Diablo Steam, $6.25@8.25 for fine and coarse respectively; English and Scotch Steam, $9.50@10; Nanaimo, $9.50@10; Seattle, $9.50@10; Anthracite, $12@15; Lehigh, $14@15; Wellington, $10.50@11. The *Johan Irgens* is at hand with 1.129 tons, and *River Lune* with 1,600 tons Australian, both from Newcastle, N. S. W.

Richmond, Va. March 14, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous	$4 50
" semi-Cannel	4 75	Clover Hill Coal	4 00
Coalburgh Splint	4 75	James River Bitum	3 30
Lewiston "	4 75	" " Carbonite	5 80
Kanawha Gas coal	4 50		

Montreal. March 14, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$6 00	Cape Breton Steam	$5 25
Pictou "	5 75	Newcastle Smiths	7 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$8 50	Chestnut	8 50
Stove	9 50		

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals, per ton of 2240 lb.	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	2 30	2 16	2 74	2 63	2 86
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	..	56	47	70
‡ Philipsburg, N. J., (46 miles)	86	72	1 21	1 19	1 42
Elizabethp't, (114 m.) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 94	1 80	2 29	2 27	2 50
High Bridge, N. J.	2 40	1 95	2 80	2 54	2 72
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	2 30	2 16	2 63	2 63	2 86
Jersey City, N. J., (121 miles) and New York, via L. V. RR.	2 30	2 16	2 63	2 63	2 86
Andover, via Delaware, Lackawanna and Western RR	3 30	3 10	3 70	3 69	3 99
Trenton Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, (97 m.) for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR. $2 37

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 75

††From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware Lackawanna and Western RR., Morris and Essex Division 1 14

From *Lackawanna Junction* to *Auburn, N. Y.*, (191 m.) for shipment, via Southern Central R R. in connection with Pa. and N. Y. R.R. 2 53

From *Lackawanna Junction* to *Weedsport* (201 m.), for *Rochester and Charlotte* 2 59

From *Lackawanna Junction* to *Sterling* for *Oswego, N. Y.* .. 2 62

‖ To this point for all places between Rochester and Buffalo the rate is 2 53

* The rate to this point for Syracuse is 2 08

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

† Transportation on Coal destined for re shipment from this point is 20c. less than above rate.

†† The rate for consumption to this point is $1 80.

The distances in the above table are computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

Freights.

Per ton of 2240 lb.

Ports.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	....	....	....	....
Amesbury, Mass	....	....	....	....
Bangor, Me	....	....	....	1 00
Bath, Me	....	1 65	....	1 00
Baltimore	....	....	....	....
Boston, Mass	1 25@1 50	1 50	1 60	1 00
Bridgeport, Ct	*70	1 40	....	70
Bristol, R. I.	....	....	....	90
Cambridgeport, Mass.	§1 25@1 50	....	....	1 00
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	§1 25@1 50	....	....	§1 00
Fall River	1 25	1 40	....	1 00
Hackensack	....	....	....	....
Hallowell, Me	....	....	....	....
Hartford	....	....	....	....
Hoboken	†70	1 20	1 25	40
Hudson	....	1 20	....	....
Jersey City	....	1 20	1 25	40
Lynn, Mass	....	....	....	†1 00
Middletown	....	....	....	1 00
Mystic	....	....	....	....
Newark	....	1 50	....	....
New Bedford	1 30	1 50	....	85
Newburyport	....	1 65	....	1 10
New Haven	*70	1 40	....	70
New London	1 25	1 40	....	80
Newport	1 25	....	....	85
New York	70††	1 20	1 25	40
Norfolk, Va	....	....	....	....
Norwalk	70‡	....	....	70
Norwich	1 25§	....	....	90
Pawtucket	1 75§	....	....	....
Philadelphia	....	....	....	....
Portland	....	1 50	....	1 00
Portsmouth, N. H.	1 50	1 65	....	1 10
Providence	1 25	1 40	....	85
Petersburg, Va	....	90	....	....
Portsmouth, Va	....	....	....	....
Poughkeepsie, N. Y.	....	....	....	....
Richmond, Va.	....	....	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	1 00
Salem, Mass	1 50	1 50	....	1 00
Salisbury Pt., Mass.	....	....	....	....
Savannah, Ga.	....	....	....	....
Stamford	*70	....	....	70
Stonington	....	....	....	....
Taunton	....	....	....	....
Trenton, N. J.	....	....	....	....
Troy	....	....	....	....
Warren, R. I.	....	....	....	85
Washington, D. C.	....	....	....	....
Wareham	....	....	....	....
Weymouth	....	....	....	....
Wilmington, Del	....	....	....	....
Wilmington, N. C.	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

Freights on Bituminous Coal and Coke over the Chesapeake and Ohio Railroad.

From New River District, say, at Quinnemont.

To	Bituminous Coal and Coke. Distances.*	Regular Rate.	Special Rate.	Coal Screenings. Rate.
	Miles.			
Charleston	75	1 00	70	50
Huntington	127	1 20	80	60
Staunton	158	2 30	2 00	1 50
Charlottesville	197	2 80	2 50	2 00
Gordonsville	218	3 00	2 70	2 40
Hanover Junction	276	3 25	3 10	2 50
Richmond	294	3 25	3 10	2 50
Richmond *via* Hanover Junction		3 50	3 35	2 75
James River	297	3 25	3 00	2 50

From Kanawha District, say, at Blacksburg.

To	Bit. Coal and Coke. Regular Rate.	Bit. Coal and Coke. Special Rate.	Cannel Coal. Regular Rate.	Cannel Coal. Special Rate.	Coal Screenings. Rate.
Charleston	80	50	1 20	80	40
Huntington	1 00	60	1 50	1 00	50
Staunton	3 00	2 50	4 00	3 50	2 00
Charlottesville	3 30	2 80	4 25	3 70	2 30
Gordonsville	3 35	2 90	4 40	3 90	2 40
Hanover Junc	3 40	3 10	4 50	4 10	2 50
Richmond	3 40	3 10	4 50	4 10	2 50
Richmond, *via* Hanover Junc	3 65	3 35	4 75	4 25	2 75
James River	3 40	3 00	4 50	4 00	2 40

A Terminal charge of ten cents per ton, in addition to rates above, will be collected on all coal and coke at James River. Also, at Huntington, a charge of five cents per ton for transferring by tipple, or ten cents per ton for transfer from car to barge on the river track.

This Tariff supersedes all *Special Rates* on coal and coke to any station, except existing special rates to iron furnaces.

Local Tariff No. 7 will govern rates to all stations, excepting as modified by this special tariff but the rate to any station, between the stations above designated, shall in no case exceed the rates named herein, to the first point beyond it, of the stations above named.

Special Rates—The rates given above in columns headed "Special Rates," will apply on all shipments of coal or coke mined or made on the line of this road, destined for use in steam or manufacturing purposes; also on all shipments destined for any point off the line of the Chesapeake and Ohio Railroad

Agents, when they cannot be certain that shipments are destined for use in steam or manufacturing purposes, will collect freight at regular rates as above, and overcharges, if any occur, will be promptly refunded through the General Freight Office.

A charge of twenty-five cents per ton, in addition to all rates herein given, will be made for delivery of coal or coke at points *between stations* requiring the use of an engine.

Coal Screenings—By "Coal Screenings" is meant dust, nut and fine coal that will pass through a screen of one and a half inch meshes, and will only be taken at the Company's convenience.

* These distances are computed from Quinnemont (or the New River District) Blacksburg (or the Kanawha District) lies 56 miles west of Quinnemont, which distance will be added to all coal going east of the New River District and deducted from Huntington and Charleston, which lie west of the same.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, March 17, 1876.

American Pig.—The Thomas Company reports a little better business, its sales having amounted to about 1,000 tons of No. 1 and No. 2 foundry at $23 and $21, respectively. With this exception, however, we learn of no improvement in business. We are reported a sale of 200 tons of No. 1 foundry, a North River brand, at less than $22.50, and hear rumors of additional forced sales at less than our quotations, but, as a rule, we are unable to authenticate them. We quote No. 1 foundry at $23; No. 2, $21; and forge at $19@20. There are rumors that a prominent furnace company, on the Lehigh, is in financial difficulties, and that production will be stopped at its works.

Scotch Pig.—There has been about two hundred tons of this article sold on private terms during the week. The arrivals are small, and the demand sufficient to prevent an accumulation of stocks. We quote Eglinton at $29@29.50; Glengarnock, $31; Coltness, $32.50@33; and Gartsherrie at $32 50.

Rails.—As we predicted in our last there been considerable sales of steel rails. The Cambria and Scranton mills have each sold 12,500 tons of steel rails for laying a third rail on the Erie road. Several weeks ago the Lehigh Valley RR. Company contracted with the Bethlehem mill for 12,000 tons for laying a third rail from Elmira to Buffalo, making a total of 37,000 tons to be used on the Erie road. The price obtained by the Cambria and Scranton Companies was $66.25 per ton, in monthly payments to extend over a period of two years. The rails to be delivered on the road. It is said that the rails will be delivered during the coming summer. In addition to the above we are reported sales of 1,200 tons of steel rails at not over $64 per ton delivered at New London, Conn., and 2,000 tons for western delivery at $61 at mill. All the mills are full of work and it is impossible to place orders for immediate delivery. From this cause more firmness is shown by makers and prices may now be quoted at $62@$64, with some prospect of a further advance. Iron rails are very quiet and quoted at $40@$43 at mills.

Old Rails.—There is nothing doing in these. Holders show more firmness and are unwilling to accept $22, which is a price bid.

Scrap is very quiet, and quoted nominally at $32.

Philadelphia Iron Trade.

Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE COX & Co., Iron Merchants, 333 Walnut street Philadelphia Week ending March 16, 1876.

The iron market continues about the same as for some weeks past, just about enough life to keep the furnaces from blowing out. We have no large sales to report, but the usual weekly sales of foundry and forge for immediate wants, but no desire to stock up beyond sure wants. We report sales of 200 tons No. 1, and 500 tons No. 2, at quotations, with about 600 tons forge or mill irons. We quote No. 1, $23 to $23.50; No. 2, $21 to $22; Gray forge, $20.50 to $22.50, as to brand.

BAR IRON, as at our last, remains extremely dull, only the hand to mouth policy, ordering to-day, what can be used up in to-morrow's work. We quote 2 35-100 to 2 5-10.

RAILS.—The enquiry for steel rails is large and some reported sales, but nothing as to iron rails.

OLD RAILS are in demand at such prices, that holders prefer to hold. Judging from the amount of steel rails going down, and amount of old rails being taken up, prices will not be better for some time. The bar mills are the largest buyers just now, as the rail mills are doing so little.

SCRAP is dull of sale at $21 to $28.

Baltimore. March 15, 1876.

Specially reported by Messrs R. C. HOFFMAN & Co.

We have no change in the iron. Sales light at about quotations.

Baltimore Charcoal	$32@35	Anthracite No. 3	$20@21
Virginia Charcoal	28@34	Mottled and White	18@19
Anthracite No. 1	23@24	Charcoal C B.Blooms,	55@60
" No. 2	21@22	Refined Blooms	65@67 50

Boston. March 11, 1876.

PIG has had a small business again this week at $25.50@26 for strictly No. 1. Outside lots of unknown brands are selling down to $24, but of these the business has only been a couple of lots. An offer of a 100-ton delivery, at Portland, at $24 on such unknown stamps, the buyer refused to take. The market here has made offers on 500 tons No. 1 leading brands f. o. b. at Hoboken and been refused. The same was done with 2000 tons gray forge at $19.50. This would indicate a stiffening at shipping points. The Walker-Pratt Foundry have landed 240 tons ex *A. Hayford*, and the Magee furnace folks 200 tons ex *Calawamkeak*. The Pembroke Mills have sent in 161 tons ex *Vulcan* on order.

BAR is unchanged. Our last quotation, $49.28 or 2 2-10c. for refined bars, has become the settled market value, and, nothwithstanding the inquiries of surprise from Western mill men, we can assure them that these "unexplained low prices" have no encouraging strength. There is a fair degree of activity in blacksmith sales, and lots of heavy hardware, carriage and wagon goods, and farming stuffs are moving very freely. One special item of interest is that Mr. ELMER W. RICHARDSON, of the old firm of PAGE, NEWELL & RICHARDSON, has made a connection with the old house of LOTHROP & Co.

STEEL is quiet and a little irregular, affected by the three colored circulars noted a week ago. Jobbers' prices are :—

We quote American tool 14@15c.; American Machinery 9@9½c.; Bessemer tires 6¼@7¼c.; Sweet's Excelsior tire, 7¼c.; English tool, 14c., to arrive, and 14¼c. from store, gold.

COPPER is dull and held at 22½c. with buyers refusing to take at over 22⅛c. The market closes in a very uncertain condition, as many shrewd ones prophesying 22c. by April, as there are predicting 22½ within the same date.

For manufactured we quote new sheathing 30c. ; bolts and braziers, 31c. ; yellow metal bolts, 20@29c.

LEAD is higher in sympathy with the London market, where war news and speculation have worked up quite a buoyancy.

We quote pig 6½c. for domestic and 6½@7½c. gold, foreign; sheet ; 10c.; pipe 9½c., currency ; tin-lined pipe, 16½c.; bar lead, 9c., less usual trade or 10 per cent. discount.

ANTIMONY is in small stock and firmer at 14½@15c.

SPELTER is steady. The combination price for February has not been changed from $7.75, currency.

TIN is very dull, and although early in the week it lost 1¼c., by Thursday it recovered and closed steadier at an advance of 1c. from the lowest point.

We quote Straits 17c.; Banca 22c.; Refined English 17c., gold. We quote plates Charcoal I. C. $7.50; Coke, $6.50 ;and Terne at $6@6.50 gold.—*Commercial Bulletin.*

Cincinnati. March 14, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Below will be found closing quotations of our pig iron market.

CHARCOAL.			
Hanging Rock, No. 1 Foundry	$25 00@	....	—4 mos
" No 2, "	23 00@	...	—4 mos
" Mill	21 00@22	00	—4 mos
Tennessee No. 1, Foundry	23 00@24	00	—4 mos
Tennessee, No. 2, "	22 00@23	00	—4 mos
" Mill	21 00@	....	—4 mos
Missouri, No. 1, Foundry	@	....	—4 mos
STONE COAL.			
Ohio, No. 1, Foundry	22 00@23	00	—4 mos
" No. 2, "	21 00@22	00	—4 mos
Ohio Mill	20 00@21	00	—4 mos
Missouri, No. 1 Foundry	27 00@	....	—4 mos
" No. 2, "	25 00@	....	—4 mos
" Mill	24 00@	....	—4 mos
CAR-WHEELS.			
Hanging Rock, C. B	40 00@50	00	—4 mos
Tennessee "	30 00@33	00	—4 mos
Missouri "	33 00@35	00	—4 mos
Alabama "	30 00@33	00	—4 mos
BLOOMS.			
Charcoal	60 00@ 70	00	—cash
SCRAP IRON.			
Cast	50c.@ 65		—cash
Wrought	85@1 00		—cash

Louisville. March 14, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

Since last report our market has been a little more active for mill grades and metal suitable for steel purposes, although quotations remain unchanged. There is a fair demand for standard mill irons, and holders of choice brands are not disposed to make concessions. All grades of foundry are dull and unchanged.

Milwaukee. March 13, 1876.

In pig iron sales have been larger, but at less prices on Frankfort and Bay View.

per ton of 2,240 lb.

Frankfort L. S. Charcoal, No 1	$28 00
" " " No. 2	27 00
" " " No. 3, 4 & 5	25 00
" " " No. 6	25 00
Mil. Anthracite L. S., No. 1	27 00
" " " No. 2	26 00
Wisconsin Iron, No. 1	25 00
Mahoning Valley Bit's No. 1	30 00
" " " No. 2	28 00

Pittsburgh, Pa. March 15, 1876.

Specially reported by A. H. CHILDS, Esq.

The metal market is very dull and prices weaker.

No 1. foundry	$24 50@25	00	—4 mos
" 2, "	23 00@24	00	—4 mos
Gray forge	21 50@23	00	—4 mos
White and mottled	19 00@21	00	—4 mos
Warm blast charcoal	22 00@26	00	—4 mos
Cold blast " Western	40 00@50	00	—4 mos

Richmond, Va. March 13, 1876.

Reported by ASA SNYDER, Esq.

Pig iron market very quiet. Receipts continue light. Sales are in excess of receipts, and hence the very small stock held here is gradually being exhausted. Quotations continue as in last week's report.

Virginia Cold Blast Charcoal Pig Iron		$27	to $33
" Warm " " " "		24	to 28
" " " Coke " "	1 X	23	to 24
" " " " "	2 X	21	to 22
" " " " "	3	20	to 21
" Anthracite	1 X	24	to 25
" "	2 X	22	to 23
" "	3	21	to 22

San Francisco, Cal.

From the *Commercial Herald*, March 2, 1876.

Our stock of Pig Iron is excessive ; prices more or less nominal. The steamship *City of Sydney* brought 100 tons. All kinds of Manufactured are plentiful. Tin Plate arrives freely. Sydney Tin 22c.

St. Louis. March 14, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market seems to be "picking up" a little ; the demand is increasing though prices remain unchanged. A much better feeling is manifested by our iron men, and hopes of a fair trade this season seems to be good.

Montreal. March 7, 1876.

We continue to quote : Pig iron Eglinton and Clyde $21.00@21.50; Carnbroe $21 50@22; American $24@26; Summerlie and Calder $22.00@23.00 ; Langloan and Gartsherrie $22.00@23.00 ; Coltness $22.50@23.50 ; Hematite $30.00@31.00. Bar, per 100 lb., Scotch and Stafford shire, $2.25@2.30 ; best do., $2.50@2.60. Swedes and Norway $5.00@5.50 ; Lowmoor and Bowling, $6.50@7.00.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, March 17, 1876.

Some of the articles on this list are in good jobbing demand, although none are receiving attention in a large way. Owing to the hand-to-mouth policy observed by buyers, it is impossible to predict the amount of business likely to be done during the spring.

Gold Coin.—During the week under review gold has ranged from 114¾ to 115, and closed, to-day, at 114⅝.

Bullion.—Fine silver bar shows quite an improvement having advanced from 1¼c. to 2c. per oz. in this market, and ¾d. in London, the San Francisco market remaining unchanged. The quotations in this city range from $1.17@$1.17¼, gold, per oz. By cable to-day the London market is quoted at 53¾d. and the San Francisco market is reported by telegraph, to-day, at 10 per cent. discount. The market for fine gold bar, is nominally unchanged. The quotation in this city is par ($20.67, gold, per oz.), and in London, 84/7¼c.

Copper.—There has been but very little business done in ingot copper during the week under review. Sales have mostly been at 22c. There are rumors that about 60,000 lb. were sold at 21¾c., but we have failed to confirm them and are inclined to disbelieve them. Holders are now asking 22¼c. with 22c. bid. The firmness here is caused by the announcement of an advance of £1 1/ to £2 in Chili bars in London, which are quoted by cable at £77 10/ @ £78.

Tin.—The market for pig tin shows but little change. The London market is a little firmer, Straits being quoted to-day, by cable, at £73@£74. The latest advices from Singapore are dated Wednesday, and quote $21 25 per picul. In this market there is a very good jobbing demand but nothing doing in a large way. The consumption of tin has very much increased, owing to its cheapness, which has given it new uses. We quote according to quantity : Straits and L. & F. 17@17½c., gold, and Banca, 22@22½c.

Tin Plates are in very good jobbing demand, at the following quotations : charcoal tins, $7.50@$7.62½, and ternes, $6.75@$7.25 ; coke tins, $6.37½@$6 50, and ternes, $6.12½@$6.25.

Lead.—This article continues very firm at 6¼c , gold, at which price sales have been made during the week. Common Missouri is quoted at 7¼c , currency, and soft Missouri at 7.58@7.70c., currency. Foreign is nominal at 6¾@7c., go.d.

Spelter and Zinc.—Domestic spelter remains unchanged at 7¾c., currency. The combination having made no change in price at their meetieg last week. Foreign, without business, is quoted nominally at 7¾c., gold. Sheet zinc is quiet at 8½c@9c., gold.

Antimony.—This article is in moderate demand. The London price has advanced to £61, and the price here to 15½c., gold.

Quicksilver is quoted at £10 10/ in London ; 61c. in San Francisco ; and 65c. @ 66c. in this city.

The San Francisco *Commercial Herald*, of March 2, says of Quicksilver: The demand of late has been inconsiderable, and the price more or less nominal. We are now shipping East upward of 1,000 flasks per month on contract. The present spot price is nominally 59c. but for prompt cash a lower rate would be accepted.

Our monthly receipts of this article compare with 1875 as follows :

MONTH.	1875 Bay, flasks.	1875 Coast, flasks.	1876 Bay, flasks.	1876 Coast, flasks.
January	1,605	2	3,877	281
February	3,284	309	3,864	62
Totals	4,889	311	7,741	343

Our exports by sea the past week have been as follows :

To	Flasks.	Value.
New York	425	$19,600
China	149	6,969
Japan	2	108
New Zealand	20	925
Australia	50	2 350
Totals for the week	647	$ 29,982
Previously since January 1st	4,726	224,003
Totals since January 1st	5,373	$253,985
Totals same period in 1875	1,798	201,313
Increase this year	3,575	$ 52,672

Our exports by sea, for February, 1875-6, were as follows :

To	1875 Flasks.	1875 Value.	1876 Flasks.	1876 Value.
China	300	$33,278	1,786	$83,308
Japan	40	4,224	36	1,732
Mexico	20	1,888	218	10,422
Australia	...	.....	156	7,328
New York	...	.....	100	4,740
Callao	300	32,437	....	.....
Valparaiso	120	13,093	....	.....
New Zealand	...	....	26	1,200
Totals	780	$84,930	2 322	$108,730

FINANCIAL.

New York Stocks,

FRIDAY, March 17, 1876.

New York stocks have been generally irregular during the period under review, the majority of quotations, however, are higher.

The feature of the week has been the failure of the National Bank of the State of New York. This failure was caused by gross mismanagement, principally in loaning very large sums on almost worthless securities. There is nothing in the suspension calculated to seriously involve other banks, and it is rumored that the large depositors have signified their assent to an arrangement looking toward re-organization, which from present indications, is probable.

Mariposa Land and Mining Company's stock has advanced nearly $3 per share during the week, closing at $10 per share for the preferred stock, with sales of over 3,000 shares for the week. The transactions in the bonds of this company have amounted to $19,000, closing at an advance of 1¼ per cent. from the highest quotation in our last.

Recent information from the mine states that the tunnel is 1,274 feet long, and the Diamond Crosscut 302 feet, with heading of bore in greenstone carrying from $1 to $4 per ton gold ; distance to fissure vein 40 feet.

Consolidation Coal Co.'s stock shows a decline to 41½ or $1.50 per share from the closing quotation in our last, with transactions aggregating 1,300 shares.

Delaware Lackawanna and Western RR. stock shows an advance of one per cent. during the week, with very limited transactions. This company and the Delaware and Hudson Canal Company, have contracted with the Erie Railway Company to lay a third rail on their line, so that the cars of the former, which are being reduced to narrow-gauge, can run over the Erie road. The Lehigh Valley Railroad Company have already laid a third rail from Waverly to Elmira, and propose to carry it on to Buffalo. This will complete the narrow gauge over the Erie road, from Buffalo and Suspension Bridge to Jersey City, the Lehigh Valley Railroad Company having already agreed to furnish the third steel rail from Waverley west to Buffalo. The Delaware and Hudson and the Delaware, Lackawanna and Western companies are to appropriate, by agreement with the Erie, one-twenty-fourth part of their transportation earnings each month for two years, to pay for the cost of the third rail from Waverly east to Jersey City. The Delaware, Lackawanna and Western are now narrowing their gauge, and the Delaware and Hudson have completed their narrow gauge. These coal companies have existing contracts for transportation of coal, and all now being narrow gauge roads, the purpose of narrowing the Erie gauge can be seen. It will also be observed that the Lehigh Valley arrangement gives the Erie a direct route from the West into Philadelphia, by way of the Lehigh Valley, North Pennsylvania, and Reading roads. This arrangement also gives the Erie the advantages of connecting with the narrow gauge roads of the West—the Lake Shore, Canada Southern, Michigan Central, etc. The Lackawanna Iron and Coal Company and the Cambria Iron Company have agreed to furnish a third steel rail for the Erie Railway from Waverly east to Jersey City. The total quantity of rails to be used in laying this third rail from Buffalo to Jersey City, will amount to about 37,000 tons.

Joliet Iron and Steel Co. The coupons on the bonds of this company are due and payable during the present month.

Quotations and Sales of Stocks and Bonds,

For the week ending March 17, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	*275	—
Consolidation Coal Co	44⅛	41⅛	41⅛	1300
Spring Mt. Coal Co	—	—	*65	
American Coal Co	—	—	53	200
Maryland Coal Co	—	—	18¼	—
Del., Lack., and West. RR. Co	119¾	118½	119	665
New Jersey Central RR. Co	107⅜	106½	107¼	877
Delaware and Hudson Canal Co	119⅞	119	119¾	199
Quicksilver Mining Co. pref'd	23	22¾	23	500
" " " Common	18¼	17½	18	600
Mariposa Land & Min. Co. various	10	7¾	10	3279
St. Louis & Iron Mountain RR	26¼	25	25½	675
Lehigh & Wilkes-Barre Coal Co	—	—	*40	—

Total Shares sold... 8295
Sale for the week previous... 12008
Decrease... 3713

* These are nominal quotations.

BONDS.

	Sales.	Price
Ches. & O. R. R. 6s, 1st. cou. on	13,000	35¼@ 35⅛
" " " ex coupon	—	— @ 32
Central RR. of N. J. 1st Mtg. N	1,000	— @114¾
" " " 1st Cons	—	— @111¾
" " " Convt.	1,000	— @109
Del. and H. Canal, 1st Mtg. 94	6,000	— @113¾
" " 7s, '84	—	— @110
" " Reg. '91	—	— @114
Del., Lack. & W. R. R., 7s, conv	—	— @—
" " " " 2d Mtg	—	— @116
St. Louis & Iron Mount'n 1st Mtg	11,000	— @101½
St. Louis & Iron M'tn 2d Mtg.	—	— @ 75
Lehigh & Wilkes-Barre Cons	26,000	96½@ 97½

Total Sales ... $68,000

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, March 17, 1876.

With the exception of an advance of ⅝ per cent. in the shares of the Philadelphia and Reading RR. Company, a slight decline has occurred in the general stock list at this market. The activity in the stock of the Pennsylvania RR. Company continues, sales for the week having amounted to over 65,000 shares.

Cambria Iron Company's stock has sold during the week, to the amount of 1,000 shares at $17 per share.

Transactions in bonds have amounted to nearly $175,000 since our last.

Penn Gas Coal Company.—100 shares shares stock of this company were sold at auction during the week at $50 per share.

Honey Brook Coal Company. We note a sale of $1,000 in the 7 per cent. bonds of this company at 95.

Quotations and Sales of Stocks and Bonds,

For the week ending March 16, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr's
Lehigh Valley RR. Co	63	62¼	62¾	535
Pennsylvania RR.	57⅛	56⅜	56⅜	65650
Reading RR.	51⅝	51⅜	51⅜	15550
Lehigh Coal and Nav. Co	50¾	50⅜	50⅜	1970
Penn. Canal	—	—	9	—
Buck Mountain Coal Co.	—	—	30	—
Fulton Coal Co.	—	—	3½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	84	—
St. Nicholas Coal Co.	—	—	1	—
Cambria Iron Co	—	—	17	1000
Crane Iron Co	—	—	46	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co	—	—	77	5

Total shares sold ... 84,710
Sales for the week previous... 94,050
Decrease... 9,340

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	—	— @112
" " " 2d " "	—	— @104
" " " 3d " cons	—	— @ 60
Lehigh Valley RR. Con. mtg. 6s, Reg	19,000	100⅛@100¾
" " 7s, 1910	16,000	— @111
" " 6s Reg	12,000	107⅛@107½
Pennsylvania RR., 1st mtge. 6s	5 000	— @104¾
" gen. " cou. 1910	8,000	104⅛@104¾
" " gen. " 6s, reg	74,000	107¼@108
" " Cons. M. 6s cou	—	— @ 99¼
Phil. & Reading RR. 7s 93	—	— @112
" " G. M. 7s, cou	8,000	109 @109½
" " " " Deb. 6s	—	— @ 82
" " new convertible 7s	7,600	105¼@106
Phil. & Reading C. & I. Co. Deb. 7s	—	— @ 82
" " Swatara tract	3,000	— @ 90
Lehigh Coal & Nav. Co., 6s '84	1,100	— @105
" " " RR., '97	100	— @104
" " " Con m. 7s	2,000	— @105
" " " Convt. gold, '97	8,500	105¼@106¼
Penn. Canal, 6s	2,000	— @ 75
Penn. and N. Y. Canal, 7s	—	— @110
Ches. and Del. Canal, 6s	—	— @ 86
Susquehanna Canal, 6s	8,000	— @ 75¾
Susquehanna Coal Co. 7s	—	— @ 85
Buck. Mount Coal Co. 6s	—	— @ 97½
Penn. Gas Coal Co. 6s	—	— @100¼

Total amount of sales ... $174,300

Closing quotations, in the absence of sales, represent the latest prices bid.

A typographical error in our last made us say that the aggregate sale of bonds in the above table, for the week, was $96,000, when it should have been $66,000.

Gold and Silver Stocks.

NEW YORK, March 17, 1876.

Mining shares are irregular with a general tendency to lower prices.

Hale & Norcross has advanced to $65 per share, which is $20 higher than quoted in our issue of the 11th inst.

Consolidated Virginia.—A recent letter from this mine states that "All parts of the mine are looking well and yielding the desired quantity of ore. The winze in the east end of cross-cut No. 2, has been sunk the past week 11 feet. The ore is very rich. The C. & C shaft has been extended 29 feet. At the C. & C. shaft good progress has been made. All the pumps and machinery work well." It is anticipated that the bullion product of this mine for the present month will amount to over $3,000,000, the ore product for last month amounted to over 21,000 tons or an average of about 830 tons per day.

California.—It is expected that this company will begin hoisting ore during the present month, the mine is in a very favorable condition, and the output will be very large.

Savage.—The stock of this company has advanced $3 per share. The pumps at the mine are kept in constant operation.

Raymond & Ely has declined $3 per share. The February shipments of this company amounted to $103,823. It is stated that the ore in this mine is increasing in richness. The pump is now working six, seven, and sometimes eight strokes, by which they manage to keep the shaft perfectly dry, running it about seventeen out of twenty-four hours. The progress of sinking is continued as rapidly as possible. On the eighth, ninth, and tenth levels, work is progressing.

The Justice Mining Co. has levied an assessment of $5 per share, delinquent April 4th. This stock is steady at $26 per share.

The Redington Quicksilver Mining Co. has declared a dividend of $10 per share.

Dividends for February.—The San Francisco *Stock Report* gives the following as the dividends paid during February, by various mining incorporations:

	Per share.	
Consolidated Virginia Mining Co	$10	$1,080,000
Belcher Mining Co	1	104,000
Northern Belle Mining Co	1	50,000
West Comstock Mining Co	50c.	50,000
Leopard Mining Co	75c.	37,500
Readington Mining Co. (Quicksilver)	$10	12,600
Black Bear Mining Co	40c.	12,000
Lyon Mill and Mining Co	50c.	10,000
Alps Mining Co	25c.	7,500
Empire Mining Co	$5	5,000
Total		1,368,600
The sum paid during the same period in 1874, amounted to		434,300
Increase		934,300

Denver, Colorado. Stock Board.—From the *Mining Review* we take the following, as the latest quotations of stocks, dealt in at the Denver Stock Board, up to March the 4th:

"Cash, $20,000. East Roe, $7.90; Hercules and Seventhirty, $5.20; Victoria, $4.00; Gold Hill, $1 00; Phil. Sheridan, $2.40; Pleasant View, $2.20; and Polar Star, $5.00.

"The total value of the sales at this board, for the present year, up to Feb 19 has amounted to $38,888.55.

"Certificates of incorporation of the following companies have been filed with the Secretary of Territory: Consolidated Caribou Belt Mining Company, counties of Boulder and Arapahoe, capital stock, $500,000. Barlow Silver Mining Company, county of Hinsdale, capital stock, $500,000.

QUOTATIONS:

	No. of shares.	March 9.	Mar. 16.
Sierra Nevada	100,000	$25	$24
Union Consolidated	100,000	21	15
Mexican	108,000	40	34
Ophir	108,000	71	61
California	540,000	90	89
Consolidated Virginia	108,000	440	435
Best & Belcher	100,800	62	59
Gould & Curry	108,000	23	21
Savage	112,000	16	19
Hale and Norcross	16,000	45	65
Chollar Potosi	28,000	125	127
Alpha Consolidated	30,000	40	44
Imperial	100,000	15	13
Yellow Jacket	24,000	111	115
Kentuck	30,000	20	17
Crown Point	100,000	26	24
Belcher	104,000	37	33
Overman	38,400	88	80
Caledonia	20,000	63	66
Justice	105,000	26	26
Raymond & Ely	30,000	20	17
Meadow Valley	60,000	3	3
Eureka Consolidated	50,000	13	11
Eureka C. V.	20,000	3	3
Silver Hill	54,000	12	9
Julia	110,000	17	16

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, room 7 Traveller Building, 31 State street, Boston.

BOSTON, THURSDAY EVENING, March 16, 1876.

The market closes dull on all mining stocks. Allouez has declined from 21 to 20 asked, 18⅞ best bid. Their president, JOHN WHITE, has retired, and EDW. WHITE, of N. Y., will fill that position. Calumet steady at about previous quotations. Copper Falls, no sales or change. Franklin steady, very little inclination to trade either way. Petherick is a little weaker at ¾ asked. Sale of Pewabic at 5¼, same bid. Not a sale of Quincy, 40¼ bid. Ridge has sold during the week at 5¼, and 100 today at 5. At this figure the stock looks cheap, and only wants a more active market to advance materially. On the small coppers nothing doing or new to call for comment.

Description.	Par Value.	No. of Shares.	Closing. Bid.	Asked.
Allouez	$50	20,000	$18 50	$20 00
Calumet and Hecla	50	80,000	168 25	169 00
Central	25	20,000	30 00	31 00
Copper Falls	25	20,000	3 87½	4 00
Dana	25	20,000	10	18
Duncan Silver	20	60,000		
Franklin	25	20,000	14 00	14 25
Humboldt	25	20,000	10	20
Madisca	25	20,000	15	25
Mesnard	25	20,000	60	62½
Minnesota	25	20,000	2 50	3 00
National	25	20,000	2 50	2 75
Petherick	25	20,000	25	37½
Pewabic	25	20,000	5 50	5 75
Phenix	25	20,000		
Quincy	25	20,000	40 25	40 75
Ridge	25	20,000	5 00	5 25
Rockland	25	20,000	30	37½
International Silver	—	—	20	23
Star	25	20,000	20	25
Superior	25	20,000	12	15
Eastern RR.				

Gas Stocks.

NEW YORK, March 17, 1876.

We have no improvement to chronicle in the movement of gas stocks. The stock of the New York companies still continue to press on the market, while Brooklyn stocks are dull and lower, and sales are generally made at marked concessions. We learn of large transactions in the stock of the Williamsburgh Gas Co., during the week at $120 per share. 100 shares of the stock of the Manhattan Gas Co. were sold at private sale during the week at $264.

Jersey City Gas Co.—We note a decline of $20 per share in the stock of this company.

Metropolitan, N. Y. Gas Co.—We note auction sales of the scrip stock of this company amounting to $10,000, at from 101¾ to 103.

The Montreal Gas Co. has declared a semi-annual dividend of 4 per cent, We note recent sales of this stock amounting to some 600 shares at 156½, dividend off.

Peoples' Gas Co., of Baltimore, Md.—We note recent sales of the stock of this company amounting to about 150 shares at from 25½ to 25¾.

San Francisco Gas Co.—175 shares of this stock recently sold at par.

Elizabeth, N. J. Gas Co.—The City Council of Elizabeth has passed a resolution appropriating $38,000 for lighting the public places of that city during the present year.

Albany Gas Co.—A correspondent advises that this company has reduced the price of gas from $3 to $2,75, to take effect the 1st of March. That is 25c. per thousand feet lower than in 1860, before the raise in values caused by the war. Our correspondent further adds: "The enormous volume of the business in N. Y., and the lower cost of coal; with the advantage of receiving fresh mined coals all winter, making the cost of gas here at least 50c. per thousand greater than to the N. Y. companies."

St. Louis Gas Companies'—Much excitement is said to prevail in St. Louis over a contest between the city government and the two leading gas companies there. The city claims title to the works of both since 1870, alleging that the profits derived since that date belong to it. The City Council has declined to pay further bills for gas, and the Laclede Company has informed the Mayor that the gas will be shut off in the northern part of the city unless the gas bills are paid by the 1st of April. The Mayor has directed the city engineer to furnish estimates of the cost of lighting the streets with oil. As the stock of these companies does not seem to be affected by the difficulties above referred to, orders from St. Louis having been received in this city directing the purchase of all of the stock of the Laclede Company which may be offered at about present quotations, it is fair to presume that the gas companies are correct in their position.

The Municipal Gas Co. is now making gas under the Tessié du Motay patent, at their works, foot of Forty-first street and North River. About two weeks ago they lighted the Gilsey House, and since then have introduced their gas in two or three other places. They are furnishing a gas of about twenty candle power of a specific gravity of about ·65 or ·67. The price charged at present is the same as that of other companies in this city. The capital stock of the company is $500,000.

PRICE OF GAS.

We collect, principally from recent issues of this Journal, the following list of Gas Companies (the majority of which have made reduction in the price of gas since the first of January), showing the present rate charged by them per 1,000 cubic feet:

Little Rock, Ark[1]	$5 00	Baltimore, Md.[13]	3 00
Augusta, Ga	4 00	Altoona, Pa.	3 00
Bayonne City, N.J	4 00	Harrisburg, Pa	3 00
Charlestown, W.Va	4 00	Reading, Pa	3 00
Lyons, N.Y.	4 00	Williamsport, Pa	2 92
Belfast, Me.[2]	4 00	Newark, N.J.	2 85
East Newark, N.J	4 00	Brooklyn, N. Y. (six companies) each	2 75
Meriden, Conn	3 93	Harlem, N.Y.[14]	2 75
Hagerstown, Md	3 75	Syracuse, N.Y.	2 75
Brockville Ontario	3 75	New Haven, Conn	2 75
Bloomfield, N.J.	3 75	Hartford, Conn	2 75
Staten Island, N.Y.[3]	3 75	Albany, N.Y.	2 75
Rome, N.Y.	3 60	Camden, N.J	2 75
Camden, N.J	3 60	Hoboken, N.J	2 75
Eastchester, N.Y	3 50	Jersey City, N.J.	2 75
Wilkes-Barre, Pa.[4]	3 50	Zanesville, Ohio	2 70
Charlottesville, Va.[5]	3 50	Poughkeepsie, N. Y. (Citizens')[15]	2 70
Marietta, Ohio[6]	3 50	New York City (four companies) each	2 50
Elkhart, Ind	3 50	New York City (Municipal Company)[16]	2 50
Guelph, Ontario	3 50	Lowell, Mass	2 00
Peoria, Ill.	3 50	Chicago, Ill.	2 50
Bath, Me.	3 50		
Terre Haute, Ind	3 50		
Jamaica Plains, Mass[7]	3 50		

Pottsville, Pa.[8]	3 50	Trenton, N.J.	2 50
Fredericksburg, Va.	3 40	Washington, D.C.[17]	2 25
Akron, Ohio	3 30	Boston, Mass.[14]	2 25
Utica, N.Y.	3 25	Providence, R.I.	2 25
Laclede, St. Louis, Mo.	3 25	Buffalo, N.Y.	2 25
York, Pa.	3 20	St. Louis, Mo.	2 25
Nantucket, Mass.[9]	3 00	Philadelphia, Pa.	2 15
Erie, Pa.[10]	3 00	Sunbury, Pa.	2 00
Knoxville, Tenn.[11]	3 00	Richmond, Va.	2 00
Tiffin, Ohio	3 00	Allegheny City, Pa.	1 80
East New York[12]	3 00	Cincinnati, Ohio[18]	1 70
Cumberland, Md.	3 00	Pittsburgh, Pa.	1 00
Elizabeth, N.J.	3 00	Detroit, Mich.[19]	1 00
Springfield, Mass.[13]	3 00		

1. The gas used here is made from Pittsburgh coal and pine knots. 2. Ten per cent. discount on bills over $10, and five per cent. discount for bills under $10. 3. Five per cent. off for prompt payments. 4. Ten per cent. discount for prompt payment. 5. Rent of meter 20c. per m. 6. 20c. per m. discount for prompt payment, and 30c. additional to this to all persons using 3,000 feet and over. 7. This company charge the city $3 per m. 8. Ten per cent. reduction from bills if paid within 20 days. 9. Rent of meter 15c. per m. 10. This company receives from the city $28 per annum for each lamp. 11. Rent of meter 15c. per m. 12. This company has reduced to this figure in exceptional instances, the general rate charged by them being $4 per m. 13. One-twelfth discount from bills for prompt payments. 14. These rates will go into effect on the 1st of April next. 15. Gwynne-Harris process. 16. This is a water gas manufactured by the Tessié du Motay process. 17. This rate will go into effect on the 1st of May. 18. There is a second gas company in this city which, it is stated, supplies consumers at $1 per m. 19. Naptha gas.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Quotations "bid" and "asked" of New York City and Vicinity Gas Companies are on the $100 of stock and not on one share.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Divid.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N.Y.	$5,000,000	$ 100	2¼	Jan. '76	109	110
" " Bonds	900,00	1,000	‡3½	Aug. '75	105	
NewYork, "	4,000,000		5	Jan. '76	140	145
Metropol. "	2,500,000	100	5	Sept. '75	140	143
" " Certf.	1,000,000		3½	" "	100	103½
" " Bonds	500,000	1,000	3¼	July, "	105	
Harlem "	1,850,000	50	4	Feb. '76	120	123
Manhattan"	4,000,000	50	10	Jan. "	260	270
Brooklyn, B'klyn	2,000,000	25	5	Nov. '75	185	190
Nassau "	1,000,000	20	4	July, "	90	95
" " Certf.	700,000	1,000	3½	Nov. "	95	98
People's "	1,600,000	10	3¾	Jan. '76	65	70
" " Certf.	300,000	1,000	3½	July, '75	85	86
" " Bds	325,000	....	3½	Aug. "		95
Metropol. "	1,000,000	10	3½	May, "	65	70
Wmsburgh "	1,000,000	50	5	July, "	120	125
" " Certf.	1,000,000	....	3½	July, "	95	98
Citizen's "	1,200,000	20	2½	Jan. '76	95	100
" " Certf.	320,000	1,000	3½	Oct. '75	99	101
J. C. N.J.	386,000	20	5	July, "	140	160
Centl. Westch. N.Y.	466,000	50	4	July, "	100	105

‡ Gold.

Companies out of Town.*	Cap. Stk.	Par	Bid	Askd
People's " " of J. C.			125	135
¶Citizen's G. L. Co., New'k. N.J.	1,095,000	50		90
Hempstead" " L. I., N.Y.	40,000	100		100
Jamaica, " " "	25,000	100		100
Richmond Co., S. I. "	300,000		100	105
Citizens', Rochester, "		100	60	68
Rochester Gas Co., "		100	50	
‖People's G. L. Co. Albany,"	1,000,000	100	31	40
§Mutual " Buffalo "	750,000	100	45	55
Mutual " Detroit. Mich.		50	18	
TroyG. L. Co., Troy, N. Y.			108	
Brockport, N. Y., G. L. Co.	25,000	100		80
†Baltimore G. L. Co., Balt., Md	2,000,000	100	175	
People's G. L. Co., Balt., Md	2,000,000	25	25⅛	25¾
Hannibal G. L. Co., Hanni., Mo.	100,000	100	95	100
La Clede, Mo		100	114	120
Lewiston G. L. Co., Lewis., Me	400,000	100	33	
Chicago G. L. Co., Chicago, Ill.	2,000,000	100		130
Jacksonville, Ill.	120,000	100	82	
‡Lima, Ohio.	60 000	100	10	
Derby G. L. Co., Derby, Conn.	160,000	100		80
Woonskt G. L. Co.Woonskt, R.I.	150,000	100	100	
Fort Wayne G. L. Co. F. W., Ind		100	90	100
North. LibertiesG. L. Co. Phila.		25	29	
Wilkes-Barre G. L. Co W. B. Pa.		50	70	
Washington G. L. Co., Phila.			42	43
Pottsville, Pa. Gas Co		50	40⅜	
Portland G. L. Co. Portland, Me	350,000	50	72	75
Hartford G. L. Co., Hartford, Ct	700,000	25	41	
Boston G. L. Co., Boston, Mass.	2,500,000	500	780	785
East Boston, Mass		25	132	
Chelsea G. L. Co. Chelsea, "	300,000		139	
Cambridge G. L. Co., Cam., "	700,000		132¾	
Louisville G. L. Co., Louis., Ky.			127	
Cincinnati G. L Co , Cincin, O.				200
St. Louis G. L. Co		50		160
Carondelet G. L. Co., Mo		50		6¼
S. F. G.L. Co. San Francisco, Cal	10,000,000	100	99⅛	100
City G. L. Co. Montreal, Can.	1,440,000	40	a156¼	162
Consumers G. L (old.) Tor., Ont	600,000	50	132	
Hamilton G. L. Co., Ont.	150,000	40	112½	
Halifax G. L. Co., Halifax, N.S.	400,000	40	a145	

* These quotations represent the latest obtainable prices at which sales were made.

† This Company has issued $1,000,000 in certificates in addition to their stock indebtedness, on which they pay interest at the rate of 6 per cent. gold.

‡ This Company has $30 000 in bonds outstanding.

§ $200,000 represents the bonded indebtedness of this Company; these bonds have recently been offered at 90.

‖ $300,000 of the indebtedness of this company is represented by bonds.

¶ $124,000 of the indebtedness of this company is represented by bonds; also $53,000 in certificates, which is included in the aggregate stock debt quoted.

a. Ex-dividend.

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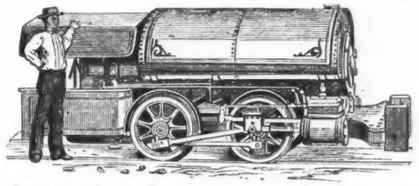

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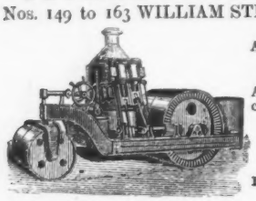

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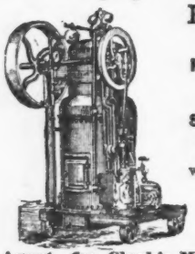

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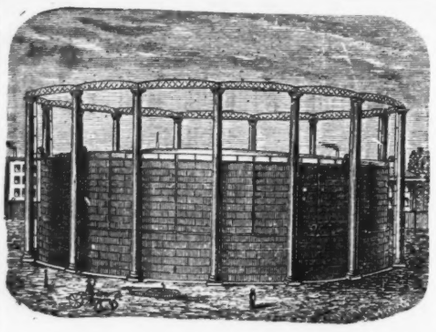

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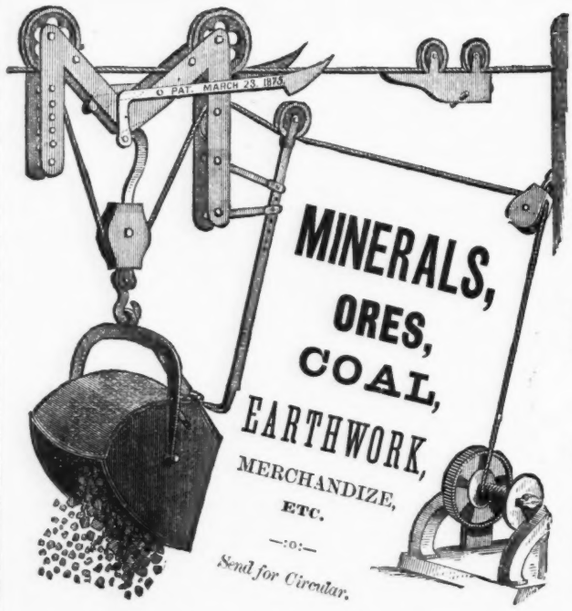

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